PROJECT MANAGEMENT OF HIGH SCHOOL SHADOW AND BUILDING AN ENGINEER DAY

A Senior Project submitted

In Partial Fulfillment

Of the Requirements for the Degree of

Bachelor of Science in Industrial Engineering

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by

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ABSTRACT

Building an Engineer Day and High School Shadow are semi-annual outreach events hosted by Cal Poly's Society of Women Engineers section during fall and spring quarters. The events focus on encouraging women and minorities to take an interest in engineering. These events are the two largest outreach events hosted by The Society of Women Engineers and need to run smoothly in order to provide student attendees with a meaningful experience.

Building an Engineer Day and High School Shadow are currently un-organized and un-planned, which leads to problems with officer retention, increase in expediting process and a low attendance rate at the events. This project's objective was to solve these issues by establishing requirements and creating solutions to meet those requirements. The engineering design process of this project was the Plan, Do, Check, Act method.

The requirements were satisfied by creating a Microsoft Access system and a Microsoft Excel document. These two files work together in order to help plan and run Building an Engineer Day and High School Shadow. The Microsoft Excel document contains a timeline, data analysis and many more features that are needed during the planning of each event. The Microsoft Access system helps with the actual running of the events.

A prototype was first created of the Microsoft Access system in order to establish if its creation positively affected the events. After conducting and analyzing a time study it was proven that the new Microsoft Access system is more effective than the previously used method. This lead into further development and eventual creation of a Microsoft Access system for both High School Shadow and Building an Engineer Day.

High School Shadow and Building an Engineer Day have two individual files that are used to plan and organize their events. These files will be stored in the event's Google Drive and another copy will be stored in the Society of Women Engineer's PolyLearn site. The document has been created for single time use; therefore previous records will be saved on the event's Google Drive and be available for future officer to review, before they begin planning the upcoming event.

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INTRODUCTION

Cal Poly's Society of Women Engineers (SWE) is an on-campus club that focuses on the advancement of women in engineering. Two of their outreach programs are High School Shadow and Building an Engineer Day. These two events target middle and high school students in order to encourage them to choose engineering as a career path. High School Shadow and Building an Engineer Day are run twice a year, during fall and spring quarts, these two events are run by a new Society of Women Engineer Officer every year.

"Building an Engineer Day is a semiannual event that occurs every fall and spring quarters. Building an Engineer (BAE) Day's objective is to introduce 6th, 7th and 8th grade students to the different types of engineering. Various engineering clubs at Cal Poly design and facilitate labs for BAE Day attendees. Each club creates a different lab that emphasizes its discipline such as aerospace engineering, mechanical engineering, civil engineering, computer engineering, and more. Attendees are divided into groups of about 15-20 students and will participate in four separate labs throughout the day." (Building an Engineer Day)

"The High School Shadow program was created by Cal Poly SWE to give high school students a taste of a true college experience. Students will shadow a college engineering student for a day - attending their classes, eating at the campus hot spots, staying overnight in the dorms" (High School Shadow)

One Society of Women officer gets selected to run each event. The SWE officers are given general information about the event but no exact rules or guidelines. The lack of timeline or information for the event creates issues for the SWE officer who is in charge of the event.

This event must run smoothly in order to provide attendees a meaningful experience that will hopefully influence their decision to go into engineering. Building an Engineer Day and High School Shadow are the largest outreach events for the Cal Poly SWE section, planning and budgeting is essential to running a successful event.

PROBLEM STATEMENT

High School Shadow and Building an Engineer Day events are currently unorganized and unstructured; resulting in poor office retention, increase in expediting costs and the small amount of attendee turn out.

The objective of this project was to find a way to help the SWE officers plan the event in a more effective way. If the planning process is made easier by improving it, then the three main issues with the officer positions will be improved. The time normally spent figuring out how to plan the event could be used to expand the effects of the event.

This project will be created by working with those directly involved with High School Shadow and Building an Engineer day, in order to identify their needs and develop a plan that will work from year to year. The knowledge used in this report was gained through the course of an Industrial Engineering undergrad program. Specifically knowledge gained from the following classes; IME 303 (Project Management), IME 312 (Database), IME 314 (Economics), IME 408 (Systems Engineering), and IME 427 (Design of Experiments). This report represents the process that was followed to create a plan for the Cal Poly Society of Women Engineers section.

BACKGROUND

Cal Poly's Society of Women Engineers (SWE) spends a lot of time and resources on its outreach core. One of the club's main goals is to increase interest in engineering as a possible career path. The Society of Women Engineers currently has 5 different outreach programs that are directed towards students from elementary to high school. The two largest events are High School Shadow (HSS) and Building and Engineer Day (BAE). HSS is geared towards students in high school who have an interest in either attending Cal Poly or are interested in seeing what a college's engineering department does. BAE is geared towards encouraging students in middle school to seek out math, science and engineering as something that's interesting and fun.

LITERATURE REVIEW

PROJECT MANAGEMENT

Project management techniques are the basis of what a project is built upon. Project management has tools and techniques to solve the "How" and "When" questions that are the starting point for any project. Wysocki view of project management is that there are three styles of project management. These styles are tradition, agile or extreme, which are chosen for the project dependent upon the level of control the project manager wishes to exert over the project. The linear project management life cycle (Linear PMLC) is one type of traditional project management, it consist of five different steps which are performed sequentially; scope, plan, launch, monitor and control, and close project (Wysocki, 2012).

"A program vision is defined, as well as program goals and objectives, consistent with the vision" (Lindgren, 2001) Project management has certain steps and aspects that need to be defined to create a successful project; all these are supported by Wysocki

and Harvard Business Review. The first aspect is the project definition, establishment of stakeholders and definition of requirements for a project. The next step is the creation of an objective and deliverables. The third step of the process is the creation of the plan of how to accomplish those deliverables (Wysocki, 2012 and HBR, 2013). During the planning phase certain graphing and definition tools like Gantt charts and work breakdown structures (WBS) are utilized.

According to Buehler monitor and control steps can have the largest amount of variation. This is due to people underestimating the amount of completion time needed. In the analysis of people's tendencies it was found that although people fail to meet their predictions, they do typically meet important deadlines (Buehler, 1994). The way to counteract this tendency is suggested by Wysocki through the creation of a milestone chart. "Milestones are significant events that you want to track in the life of the project." They do not take any time but are indications that a certain condition exists for a project (Wysocki, 2012). According to Liebig, risk mitigation and management is very important to remove risks in processes. There are three aspects in risk management; identification, analysis and response (Liebig, 2009). According to Wysocki there are multiple templates used to define and analyze the aspects Liebig observed. Wysocki states there are five different ways to avoid problems through risk mitigation. The project manager can accept that nothing can be done to mitigate the risk, avoid the situation that creates the risk, create a contingency plan, and mitigate in order to minimize the impact, or transfer the risk to someone outside of the project (Wysocki, 2012).

TECHNOLOGY/DATABASE APPLICATION

Technology is an important aspect of project management that can only be incorporated if the infrastructure of the project has been fully defined and created. The incorporation of technology needs to be done so that all levels understand how to use

the technology (Zipf, 2000). In San Diego's section of Project Management Institute, their desire to create a new database was to centralize all their data. Their method was to implement EPM Live in to create a new system where all the data was housed in a central location that was accessible to those who needed it (PR Newswire, 2013). A way of increasing an individual's knowledge and understanding is through creating a mentoring, coaching and intervention system where there is someone leading the new individual throughout the process. This type of interaction is suggested as a key element of the project management system (Anthony, 2007).

MICROSOFT EXCEL

Excel is a very common worksheet and chart management tool. Excel's spreadsheets can be programmed in the language of visual basic in Excel's Macros. Databases in Excel can either be single worksheets or multiple worksheets. (Cornell, 2007) Macros have the ability to program the worksheets and can be written to search for information across tables. Some additional features that can be programmed in Macros are search functions, filtering and editing which can be done in either columns or single cells. In 2010 a study found that Excel spreadsheets are primarily used as databases, including both numerical and textual data. (Chambers, 2010)

MICROSOFT ACCESS

Microsoft Access is a user-friendly database management tool. Access has the ability to store data in tables and then create relationships between those tables. Access also gives the user the ability to create a form that allows for easy data entry and the ability to navigate through tables (Cox, 2008). Access also has the ability organize and sort columns from multiple tables and form new tables.

A user should use an Access database if multiple tables need to be combined into one, files are too large to house in excel, and functions like VLOOKUP, Conditional Formatting or Data Validation are used multiple times (Cox, 2008).

INCORPORTATING THE TWO

The incorporation of digital spreadsheets and databases is important so that data is stored and can be easily passed from person to person. According to Schneider, Microsoft Access is an accurate and user-friends data entry system that is widely available. Microsoft Access is very useful software since it has a compatible import and export feature (Schneider, 2005). King explains the relationship between Microsoft Excel and Access and the import export feature. Excel and Access can work in tandem, allowing you to easily replicate your data and create relations between your data (King, 2009). Access and Excel both have the ability to run and sort filtered data. They can both also run calculations to obtain the desired information and have the ability to navigate through data easily (Microsoft Office).

The difference between Microsoft Access and Excel is whether or not the data is relational. Non-Relational data is when each column is directly related across rows and is only in a single table. Microsoft Excel should be used when the data is non-relational, a good representation of this a single table of students name and their contact information. Relational data is when data is stored in more than one table; a good representation of this is a table that has a student's name and their contact information and another table with the student's class schedule. Microsoft Access should be used for relational tables due to its ability to house multiple tables and relate those tables. Microsoft Excel should be used for non-relational data, however if the data gets over 15,000 rows Microsoft Access is the better choice (Nelson, 2012).

Microsoft Excel is a more widely-used database; this is due to being available in the Microsoft Office package. Microsoft Access is a less-used database due to it being available in the Office Professional package. Microsoft Office package is less expensive however if the data is relational or the non-relational data is above 15,000 rows then the user won't be able to analyze their data.

DATA COLLECTION

Collecting the correct data is crucial for showing success based upon a project's deliverables. In order to evaluate people one common data collecting technique is a survey of attendees. Saliklis conducted a survey that asses a Cal Poly outreach program in the architecture department. Parents were asked to complete a survey throughout the course of the event and a follow up survey was given to the attendees (Saliklis, 2008). Hanson's program was evaluated on its effectiveness by using a survey of responses from the program's participants. "The survey was tailored to the age group and provided assessment related to the students' interpretations of the Soils Magic experiments, their demographic backgrounds, their intentions for pursuing engineering in the future, as well as whether this program influenced their impressions of the engineering profession" (Hanson, 2006).

The implementation of surveys which evaluate student's ideas before and after an event was used by Chen in the summer program EPIC and by Zarske in a STEM program. The surveys from the EPIC program helped to make data-driven decisions about changes to the camp. (Chen, 2009) From the STEM program survey it was seen that there was a significant gain from the pre-assessment to the post-assessment in the awareness of engineering as a career. "The surveys are paired pre- to post- for each student. T-tests are used to separately determine the significance of pre- to post-

matched survey scores for awareness of engineering careers and interest in engineering" (Zarske, 2012).

METHODOLOGY

The methodology for this project is an adapted PDCA (Plan, Do, Check, Act) method. This project started with a problem and the way a solution was found was by using the PDCA method.

This senior project focused on balancing the connection between people, process and technology. The people, both the SWE officers and the attendees were the main focus. These events are organized in order to reach student attendees, however they need to be organized in a way that doesn't take too much of the SWE officer's time. The reduction in time needed to plan these events, can be done through creating a timeline or a process that every officer can follow. After a process is created then the use of technology can aid in the time reduction.

This project also had a very large emphasis on the "Triple Bottom Line". The "Triple Bottom Line" is used in analyzing how a project will affect the environment, society and economics. The environment and economics are negatively affected when a process is expedited. The expediting process is generally costly and tends to result in buying excess products which negatively affects the environment. When food or advertisements are bought at the last minute the process tends to be expedited and more food or advertisements are over-bought. This results in a larger cost and more waste.

In order to analyze if a prototype system would be effective, a time study was performed. During Building an Engineer Day and High School Shadow, the first hour was spent checking into the event. In order to test if computers check-in system would be

effective. Time to "check-in" a student was collected, first with the original paper system and the second with the created computer check-in system. A sample of 30 was collected for both of the systems and analyzed using a two sample T-Test.

DESIGN

In order to develop a system that would effectively benefit both High School Shadow and Building an Engineer Day the PDCA method was followed and expanded upon. It allows for the progression from problem to finalized system to be followed.

PLAN

The first step in the PDCA method is the plan step, which is the step where everything is thought out and designed.

PROBLEM DEFINITON

The problem with both High School Shadow and Building an Engineer Day is that there are no standard processes that are being followed. Both High School Shadow and Building an Engineer Day end up having issues with officer retention, increase in expediting costs and resulting in small attendee turn out.

High School Shadow's expectation is to have a turnout of around 100 student attendees. It is an over-night individual shadow event; therefore the expectation is to have around volunteers.

Building an Engineer Day's expectation is to have a turnout of around 200 student attendees. These attendees are organized into groups which each group getting volunteers, the event needs 50 volunteers in total in order to run effectively.

PROJECT REQUIREMENTS

High School Shadow and Building an Engineer Day are two different outreach events; however there are main issues with both events. Through meetings with SWE's president, vice president and faculty advisor main requirements were established. The following five requirements are shown below:

1. Reduce Time Commitment (Officer)
    - High School Shadow and Building an Engineer Day, take a large commitment of time to plan and organize. However since each new officer is essentially re-creating the position, time is duplicated each event.
2. Reduce Variability In Cost
    - Due to tight schedules and no deadlines things like advertisements and t-shirts are expedited at a higher cost in order to get them on time.
3. Record Event Demographics (Club Expectations)
    - High School Shadow and Building an Engineer Day currently don't analyze or keep track of attendee demographics. The events are promoted to encourage women and minorities to choose engineering as a field of interest, however currently there is no way to record or analyze this data.
4. Help Meet Event Expectations
    - The events involve organizing large groups of people. When large groups of people are involved it is essential to be able to locate them at any point. The main expectation of the event is to have student attendees enjoy the event and have all the "behind the scene" process run smoothly.
5. Remove Uncertainty From Planning Process
    - There are no current planning processes, just general guidelines. Therefore everything about the event needs to be re-organized every year. The objective is to remove the uncertainty from the planning process.

CREATE ALTERNATIVES

Building An Engineer Day and High School Shadow need a way to effectively plan, organize and run the events. There are many solutions to solving these issues.

In order to be able to effectively plan these events a timeline or Gantt chart could be created. A timeline can be cone in Microsoft Word or Excel. A Gantt chart could be done using an online software or Microsoft Project. These events can also be organized through either online software, paper instructions in a binder or in Microsoft Word document. The actual assistance in running the events could be done through online check in systems, with physical paper with information on it or with a Microsoft Access system.

The largest consideration is whether or not the system should be a document that is used continuously or a document that is used once. This distinction is the difference between officers using the same document from quarter to quarter, year to year or if it will be one document that an officer will download for each event.

TRIPLE BOTTOM LINE APPLICATION

High School Shadow and Building an Engineer Day are two outreach events that target women and minorities. The event goals are to better society by trying to give minorities and women inspiration to see engineering as a potential career goal. If the events have a timeline, then the risk of having to expedite a process decreases. When a process is expedited, there is an increase cost and sometimes waste. When Building an Engineer Day's T-Shirt orders are expedited, not only does the price increase but extra product is generally bought. This buying of extra product costs SWE money and negatively effects the environment due to the buying of excess products. The economic aspect of the triple bottom line is not only controlled by the monetary value of the

expediting cost but also the excess officer time needed. When a process takes longer than is needed the cost in form of time is increased.

DO

The "Do" step is all about transferring from theoretical planning to actually creating and doing something. In this step a prototype was created and implemented in order to test to see if the system was effective in meeting requirements.

CREATION OF PROTOTYPE

The objective in creating a prototype was for it to meet one of the initial requirements. This prototype would need to be able minimize the resources it uses and be created in a computer program that SWE's computers already have installed. The objectives of this system would be to "check-in" students and be able to locate those students during the event. The plan was to create the system in Microsoft Access so that data can be combined from multiple tables through a user interface.

The system was developed and created for implementation in Spring 2013 Building an Engineer Day. The objective was to have a trial implementation of the system before adapting it to High School Shadow. The form shown in Figure 1, is the "check-in" system that was created. This check in system was developed and created in a Microsoft Access database. The form shown in Figure 2, was used to be able to locate students during the event. These two forms were the solution to the requirements of "Help Meet Event Expectations". It stream lined the check in processes and allowed the user to be able to locate a student at any time during the event.

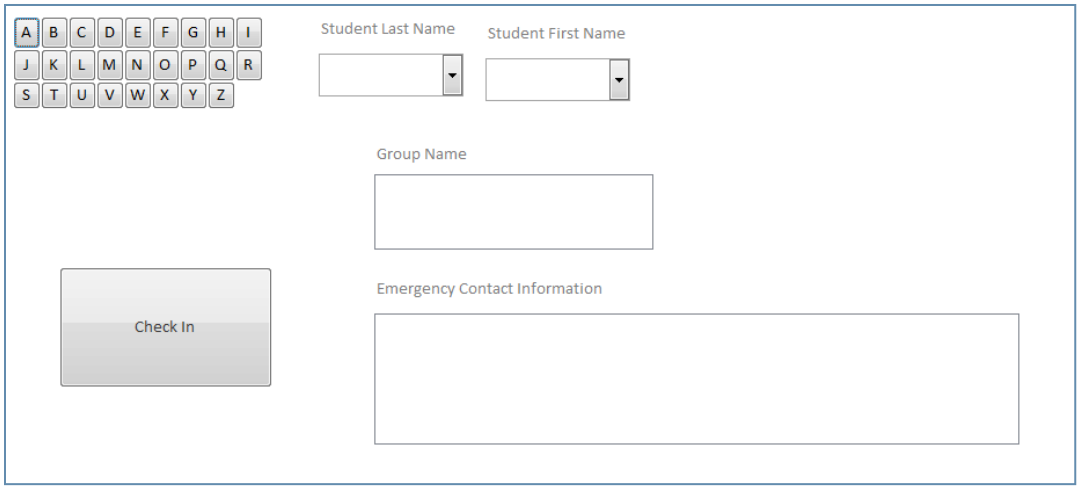


Figure 1: Building An Engineer Day Trial Check – In Implementation

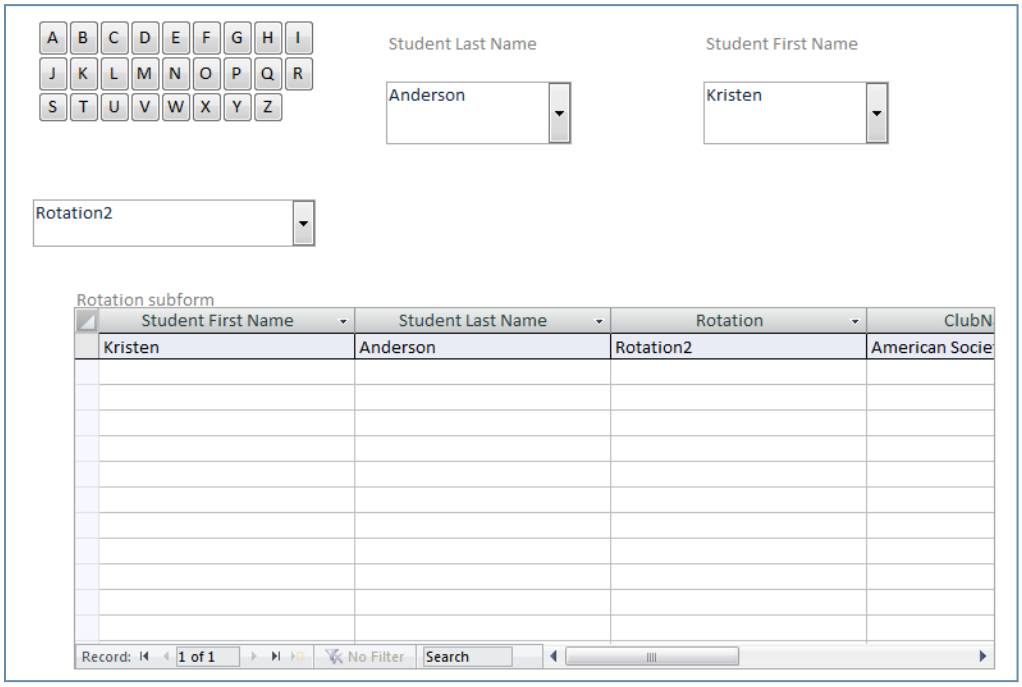


Figure 2: Building An Engineer Day Location Implementation

IMPLEMENTATION

The implementation of the system was received very well by the SWE president, vice president and faculty advisor. The implementation of the system was simple and

many people liked it more than the old system of searching names in alphabetical order. The main things that were learned during the implementation were areas that needed to be improved.

DATA COLLECTION

During the implementation of the system a time study was completed. It measured the time of 64 different students being checked in, 32 of them being checked in with the old paper method and 32 being check in with the newly created check in system. The samples were done randomly and the subjected were independent of each other.

CHECK

The 64 samples of data were tested and proved to be normal. Using a two sample t-test, it was found that the assumption that the average check in time for the paper method and the average check in time for the crated system were not the same. This indicated that the created system was important enough to develop further.

ADJUST

The implementation of the system was effective; however a few issues arose during the first trial implementation. One aspect was that there was no way to tell how many students were checked in during the process. Another aspect was that when students wanted to be in different groups there was no way to edit it within the form. The final aspect was that although the system "Help Meet Event Expectations" it didn't do anything to meet the four other requirements. The Access database's forms were easy to navigate, however there was no simple way to enter data or to easily understand the queries.

PLAN

In order to further develop upon the already created Microsoft Access document, the project process went again into the planning phase. This second planning phase's focus was geared towards creating a solution to the other four initial requirements the events had.

CREATION OF NEW SYSTEMS

In order to satisfy the four other requirements, a supplemental system was created. This system was developed in Microsoft Excel. There were numerous benefits to using Microsoft Excel. The first is that if data is entered in to an Excel file, it can easily be transferred to Microsoft Access. This allows the user to be able to easily transfer data between Excel and Access. The other function that Excel allowed was its usefulness in housing pictures, data tables, and event timelines.

The officer in charge of the events would be able to use all the information in the excel document up until the event and then easily transfer that information into the access system. This allows the user to not have to understand Access programming in order to be able to use the "Check-In" and "Location" system.

VALIDATION OF REQUIREMENTS

With the use of both the Microsoft Access system and the Microsoft Excel document the officer has all the needed information at their hands. The Microsoft Excel document would aid in reducing the amount of preparation, since all the information would be in one document. The Excel document would house all the information necessary in order to plan the event, including a timeline of all the events that need to occur in order for the event to occur. This feature would reduce the variability and

uncertainty in the planning process, which would reduce the variability in the events costs. Another aspect of the Excel document is that it can analyze data across multiple worksheets and summarize all the information into a single table on another worksheet. Through developing both a Microsoft Access system along with a Microsoft Excel document for both events, all the initial deliverables would be satisfied.

DO

In order to allow data to transfer easily between the excel document and the access database, the information between them needs to be exact. Figure 3, is a visual representation of how the data from the Excel file can be selected and pasted into the Access table. This allows the user to not have to understand how Access's tables work, just be able to enter in the information in the blue cells of the Excel document.

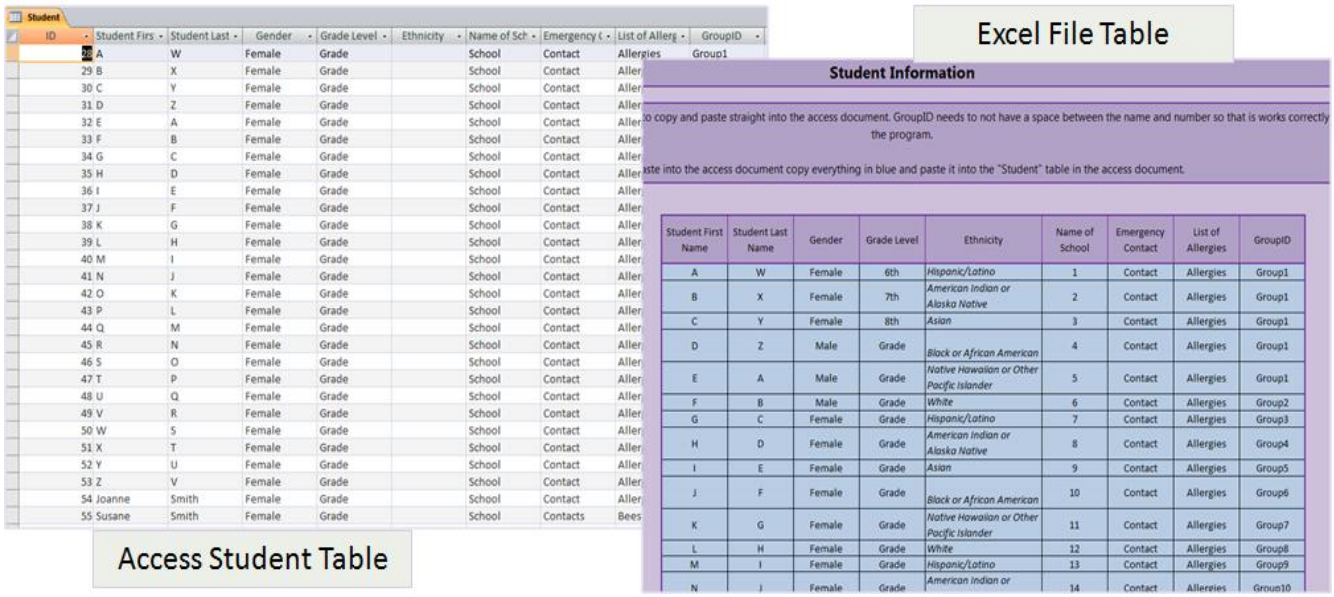


Figure 3: Excel Feeding Into Access

HIGH SCHOOL SHADOW

High School Shadow is focused on organizing students and volunteers, therefore both its Microsoft Access system and its Microsoft Excel document were focused on those needs.

EXCEL SYSTEM

In order to make the excel document easy to understand, a “Main Page” was created. This main page can be seen in Figure 4. On the main page the user can click any of the buttons and a new sheet will appear. These sheets also have buttons that say “Main Page” which when clicked with close their current worksheet and open the main page shown in Figure 4.

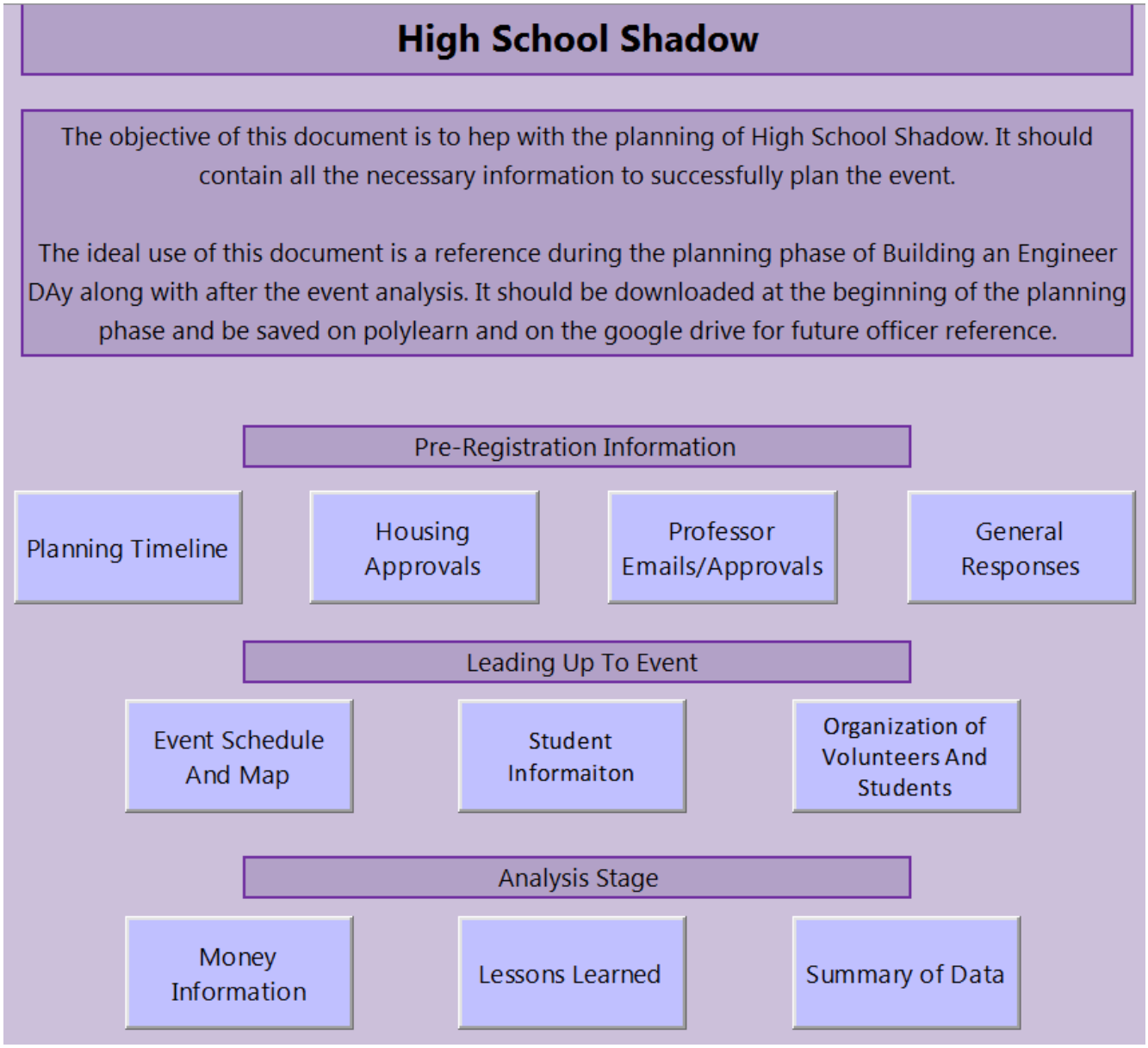
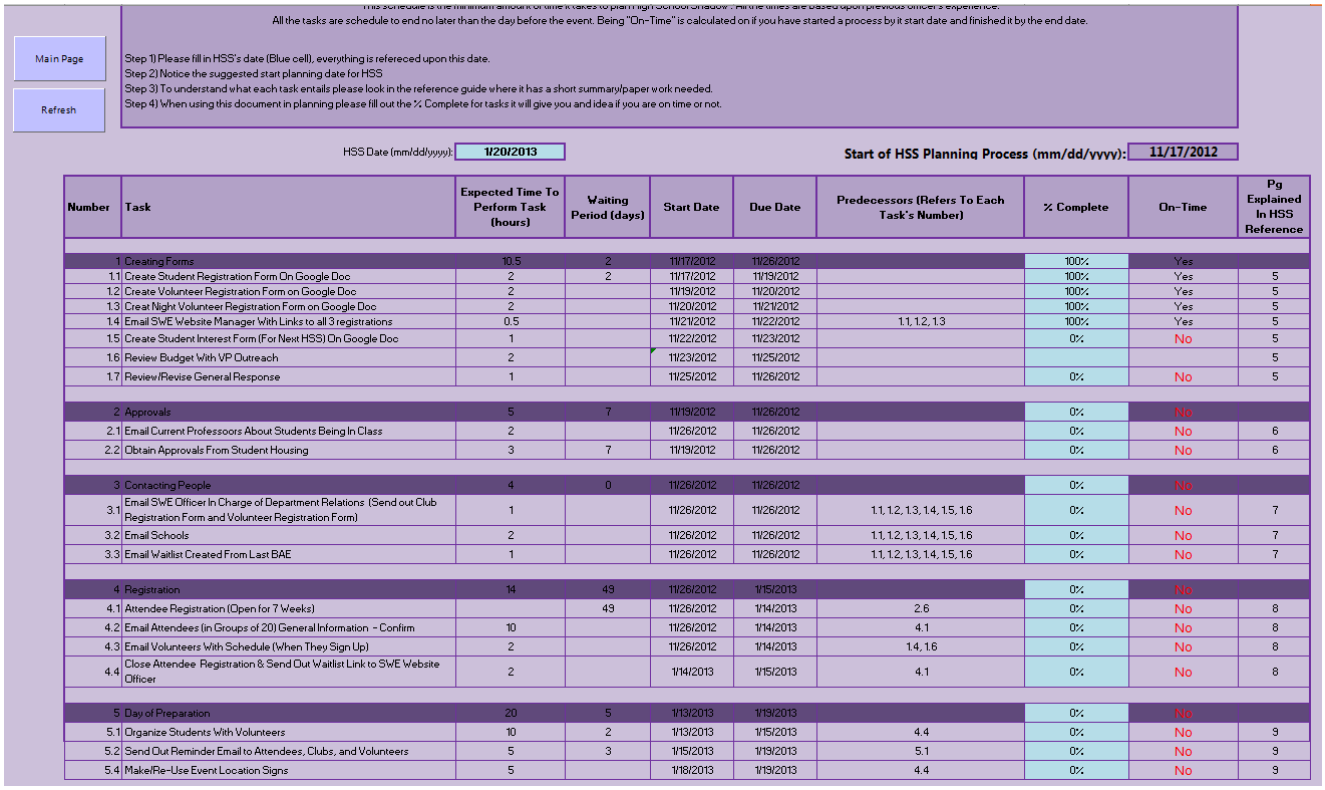


Figure 4: High School Shadow Excel Main Page

When the "Planning Timeline" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 5. This worksheet shows all of the tasks that need to occur for High School Shadow. The timeline was created with input from previous High School Shadow officers, and their opinion on how long tasks took. This worksheet works back from the date of the actual event and gives the officer the start date. This timeline is expected to be used continuously throughout the planning

process. The officer should track their progress under the "% Complete" column. The "On-Time" column will analyze the expected start date, due date and % Complete to give the officer feedback on whether or not they are on schedule.



All the tasks are schedule to end no later than the day before the event. Being "On-Time" is calculated on if you have started a process by it start date and finished it by the end date.

Main Page

Refresh

Step 1) Please fill in HSS's date (Blue cell), everything is refereced upon this date.
Step 2) Notice the suggested start planning date for HSS
Step 3) To understand what each task entails please look in the reference guide where it has a short summary/paper work needed.
Step 4) When using this document in planning please fill out the % Complete for tasks it will give you and idea if you are on time or not.

HSS Date (mm/dd/yyyy): 1/20/2013

Start of HSS Planning Process (mm/dd/yyyy): 11/17/2012

Number	Task	Expected Time To Perform Task (hours)	Waiting Period (days)	Start Date	Due Date	Predecessors (Refers To Each Task's Number)	% Complete	On-Time	Pg Explained In HSS Reference
1	Creating Forms	10.5	2	11/17/2012	11/26/2012		100%	Yes	
1.1	Create Student Registration Form On Google Doc	2	2	11/17/2012	11/19/2012		100%	Yes	5
1.2	Create Volunteer Registration Form on Google Doc	2		11/19/2012	11/20/2012		100%	Yes	5
1.3	Creat Night Volunteer Registration Form on Google Doc	2		11/20/2012	11/21/2012		100%	Yes	5
1.4	Email SWE Website Manager With Links to all 3 registrations	0.5		11/21/2012	11/22/2012	1.1, 1.2, 1.3	100%	Yes	5
1.5	Create Student Interest Form (For Next HSS) On Google Doc	1		11/22/2012	11/23/2012		0%	No	5
1.6	Review Budget With VP Outreach	2		11/23/2012	11/25/2012				5
1.7	Review/Revise General Response	1		11/25/2012	11/26/2012		0%	No	5
2	Approvals	5	7	11/19/2012	11/26/2012		0%	No	
2.1	Email Current Professoors About Students Being In Class	2		11/26/2012	11/26/2012		0%	No	6
2.2	Obtain Approvals From Student Housing	3	7	11/19/2012	11/26/2012		0%	No	6
3	Contacting People	4	0	11/26/2012	11/26/2012		0%	No	
3.1	Email SWE Officer In Charge of Department Relations (Send out Club Registration Form and Volunteer Registration Form)	1		11/26/2012	11/26/2012	1.1, 1.2, 1.3, 1.4, 1.5, 1.6	0%	No	7
3.2	Email Schools	2		11/26/2012	11/26/2012	1.1, 1.2, 1.3, 1.4, 1.5, 1.6	0%	No	7
3.3	Email Waitlist Created From Last BAE	1		11/26/2012	11/26/2012	1.1, 1.2, 1.3, 1.4, 1.5, 1.6	0%	No	7
4	Registration	14	49	11/26/2012	1/15/2013		0%	No	
4.1	Attendee Registration (Open for 7 Weeks)		49	11/26/2012	1/14/2013	2.6	0%	No	8
4.2	Email Attendees (in Groups of 20) General Information - Confirm	10		11/26/2012	1/14/2013	4.1	0%	No	8
4.3	Email Volunteers With Schedule (When They Sign Up)	2		11/26/2012	1/14/2013	1.4, 1.6	0%	No	8
4.4	Close Attendee Registration & Send Out Waitlist Link to SWE Website Officer	2		1/14/2013	1/15/2013	4.1	0%	No	8
5	Day of Preparation	20	5	1/13/2013	1/19/2013		0%	No	
5.1	Organize Students With Volunteers	10	2	1/13/2013	1/15/2013	4.4	0%	No	9
5.2	Send Out Reminder Email to Attendees, Clubs, and Volunteers	5	3	1/15/2013	1/19/2013	5.1	0%	No	9
5.4	Make/Re-Use Event Location Signs	5		1/18/2013	1/19/2013	4.4	0%	No	9

Figure 5: High School Shadow Planning Timeline

When the "Housing Approvals" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 6. This worksheet explains the process of approval that needs to be obtained to have students be allowed to spend the night in the dorm. This is a crucial step in High School Shadow that somehow tends to be over-looked.

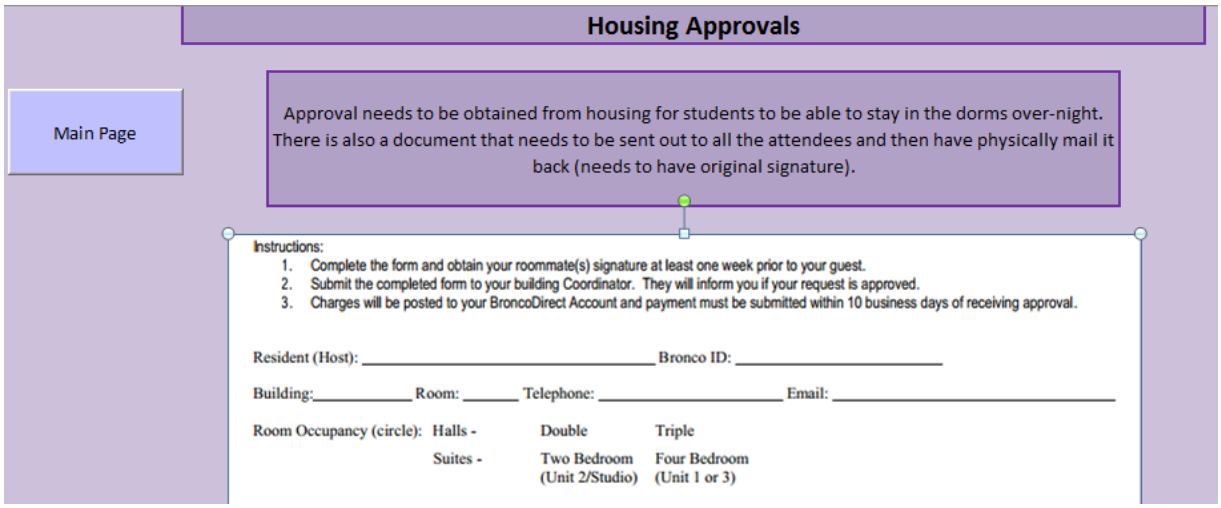
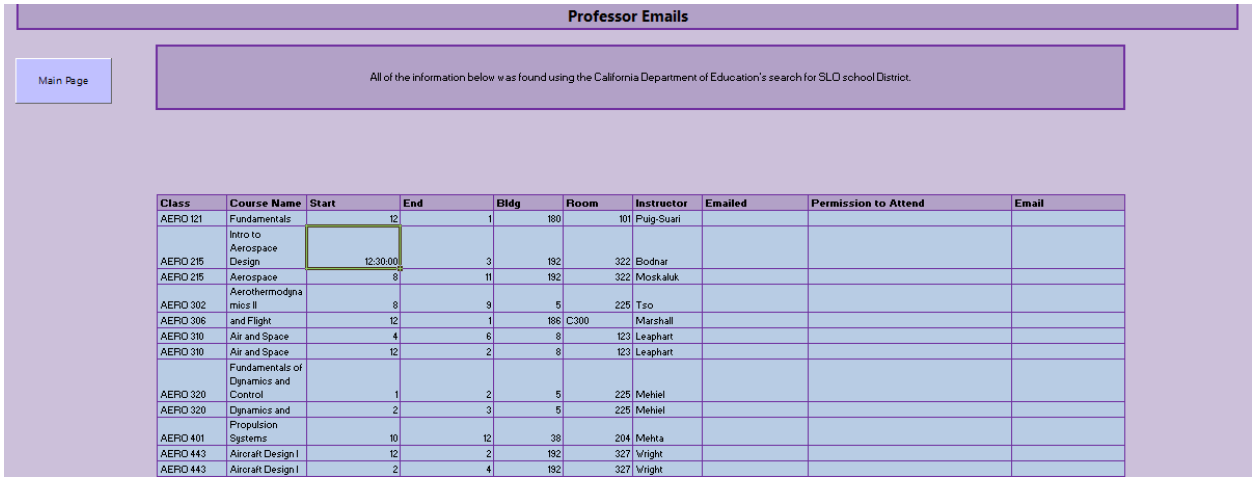


Figure 6: High School Shadow Housing Approvals

When the "Professor Emails/Approvals" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 7. This form is expected to be filled out by each new officer. It should contain the list of all the professors who are currently teaching during that quarter. This document aids in allowing the user to keep track of professor confirmations.



Class	Course Name	Start	End	Bldg	Room	Instructor	Emailed	Permission to Attend	Email
AERO 121	Fundamentals	12	1	180	101	Puig-Suari			
AERO 215	Intro to Aerospace Design	12:30:00	3	192	322	Bodnar			
AERO 215	Aerospace	8	11	192	322	Moskaluk			
AERO 302	Aerothermodynamics II	8	9	5	225	Tso			
AERO 306	and Flight	12	1	186	C300	Marshall			
AERO 310	Air and Space	4	6	8	123	Leaphart			
AERO 310	Air and Space	12	2	8	123	Leaphart			
AERO 320	Fundamentals of Dynamics and Control	1	2	5	225	Mehiel			
AERO 320	Dynamics and	2	3	5	225	Mehiel			
AERO 401	Propulsion Systems	10	12	38	204	Mehta			
AERO 443	Aircraft Design I	12	2	192	327	Wright			
AERO 443	Aircraft Design I	2	4	192	327	Wright			

Figure 7: High School Shadow Professor Emails

When the "General Responses" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 8. In order to reduce the amount of time

dedicated to emails, it is suggested that each officer create 7 "General Responses" that can copied and sent out in a matter of seconds. Emailing attendees and volunteers takes a large amount of the officer's time, with creating general responses the amount of time spent writing emails can be reduced.

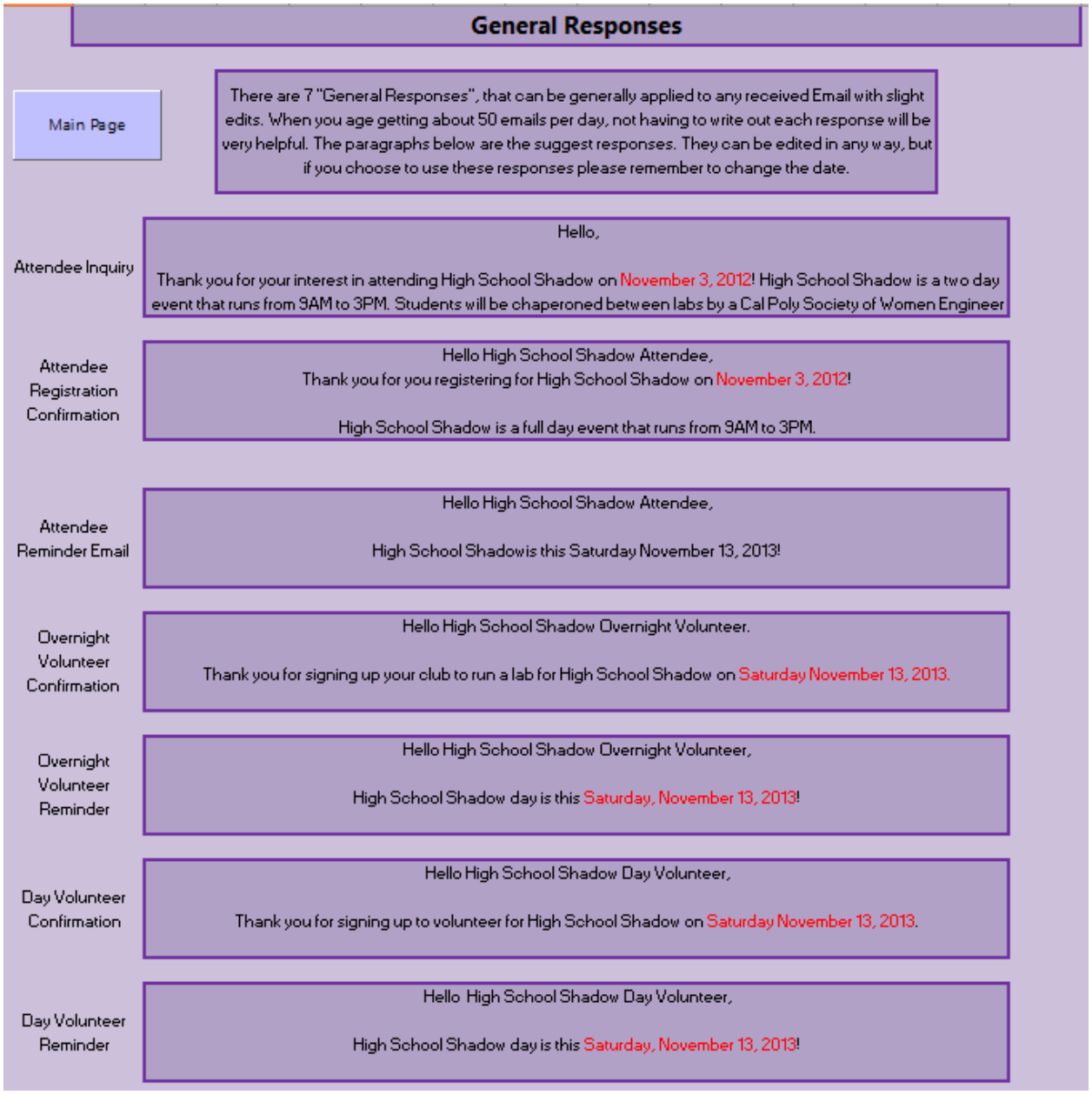
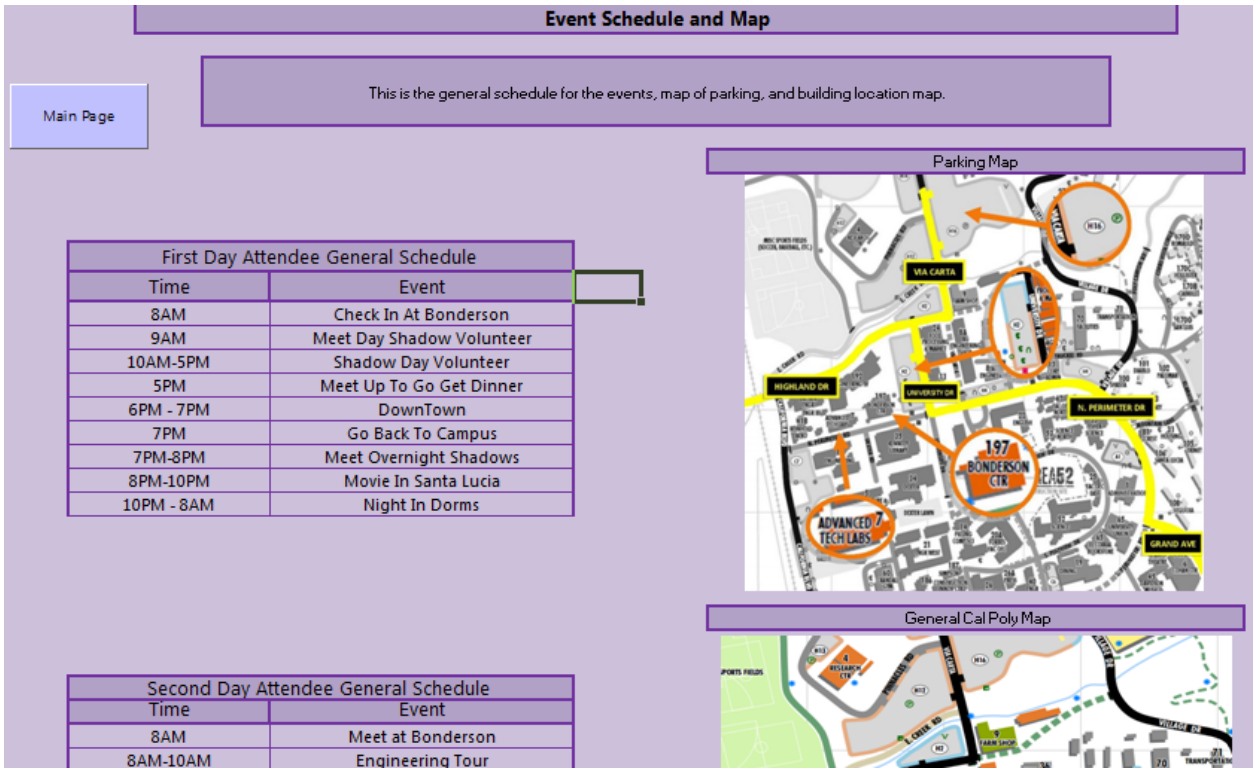


Figure 8: High School Shadow General Responses

When the "Event Schedule/Map" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 9. This schedule can changed or kept the same based upon the officer's preference, however having the information in one place allows the officer to easily send the information to others if needed.

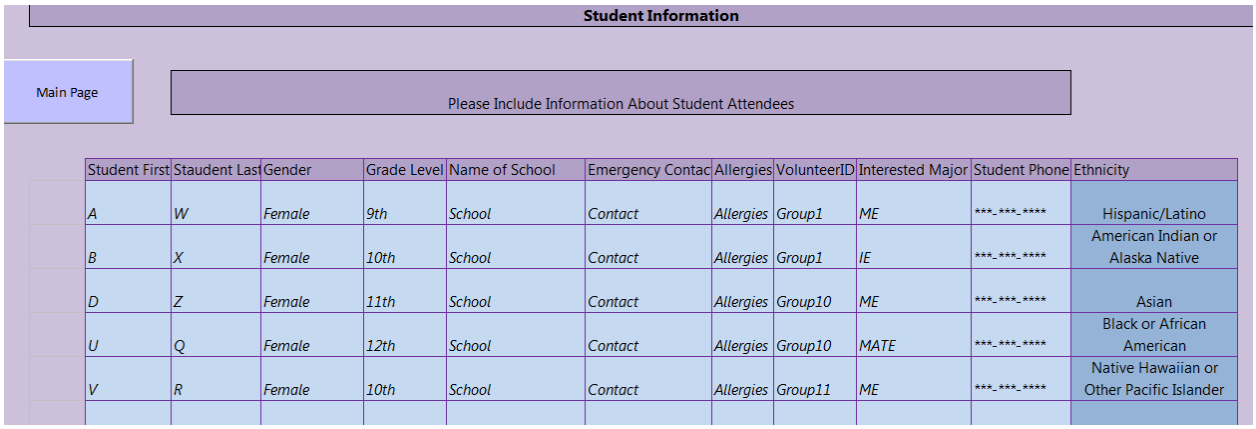


First Day Attendee General Schedule	
Time	Event
8AM	Check In At Bonderson
9AM	Meet Day Shadow Volunteer
10AM-5PM	Shadow Day Volunteer
5PM	Meet Up To Go Get Dinner
6PM - 7PM	DownTown
7PM	Go Back To Campus
7PM-8PM	Meet Overnight Shadows
8PM-10PM	Movie In Santa Lucia
10PM - 8AM	Night In Dorms

Second Day Attendee General Schedule	
Time	Event
8AM	Meet at Bonderson
8AM-10AM	Engineering Tour

Figure 9: High School Shadow Event Schedule and Map

When the "Student" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 10. This is an important worksheet because it houses all the student information. From this worksheet, data can be copied and transferred straight into the Access Database.



Student Information

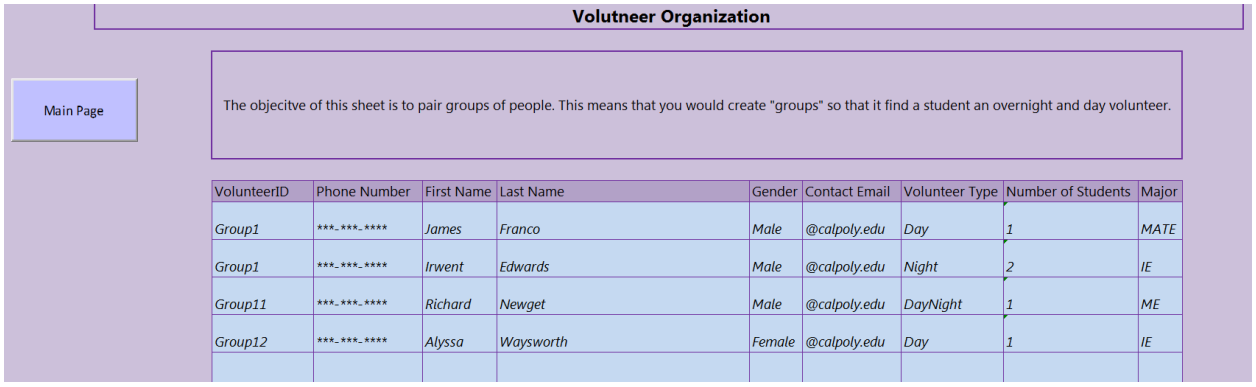
Main Page

Please Include Information About Student Attendees

Student First	Staudent Last	Gender	Grade Level	Name of School	Emergency Contac	Allergies	VolunteerID	Interested Major	Student Phone	Ethnicity
A	W	Female	9th	School	Contact	Allergies	Group1	ME	***-***-****	Hispanic/Latino
B	X	Female	10th	School	Contact	Allergies	Group1	IE	***-***-****	American Indian or Alaska Native
D	Z	Female	11th	School	Contact	Allergies	Group10	ME	***-***-****	Asian
U	Q	Female	12th	School	Contact	Allergies	Group10	MATE	***-***-****	Black or African American
V	R	Female	10th	School	Contact	Allergies	Group11	ME	***-***-****	Native Hawaiian or Other Pacific Islander

Figure 10: High School Shadow Student Information

When the "Organization of Volunteers/Students" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 11. This is the document where volunteer information is housed and students are paired with their shadows. This document is also copied and pasted straight into the Microsoft Access document.



Volutneer Organization

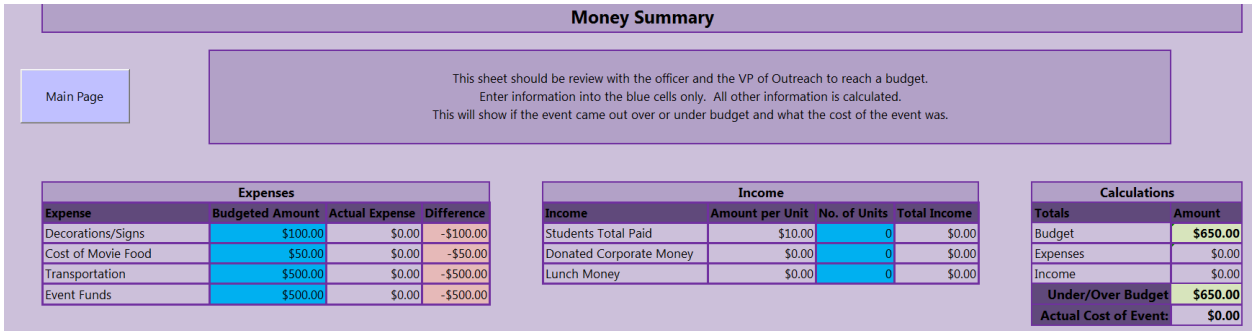
Main Page

The objecitve of this sheet is to pair groups of people. This means that you would create "groups" so that it find a student an overnight and day volunteer.

VolunteerID	Phone Number	First Name	Last Name	Gender	Contact Email	Volunteer Type	Number of Students	Major
Group1	***-***-****	James	Franco	Male	@calpoly.edu	Day	1	MATE
Group1	***-***-****	Irwent	Edwards	Male	@calpoly.edu	Night	2	IE
Group11	***-***-****	Richard	Newget	Male	@calpoly.edu	DayNight	1	ME
Group12	***-***-****	Alyssa	Waysworth	Female	@calpoly.edu	Day	1	IE

Figure 11: High School Shadow Volunteer Organization

When the "Money Information" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 12. These are basic tables that will help the officer stay aware of the amount of money that they are expected to spend. This sheet allows the officer to understand where all the money for the event goes.



Money Summary

Main Page

This sheet should be review with the officer and the VP of Outreach to reach a budget.
Enter information into the blue cells only. All other information is calculated.
This will show if the event came out over or under budget and what the cost of the event was.

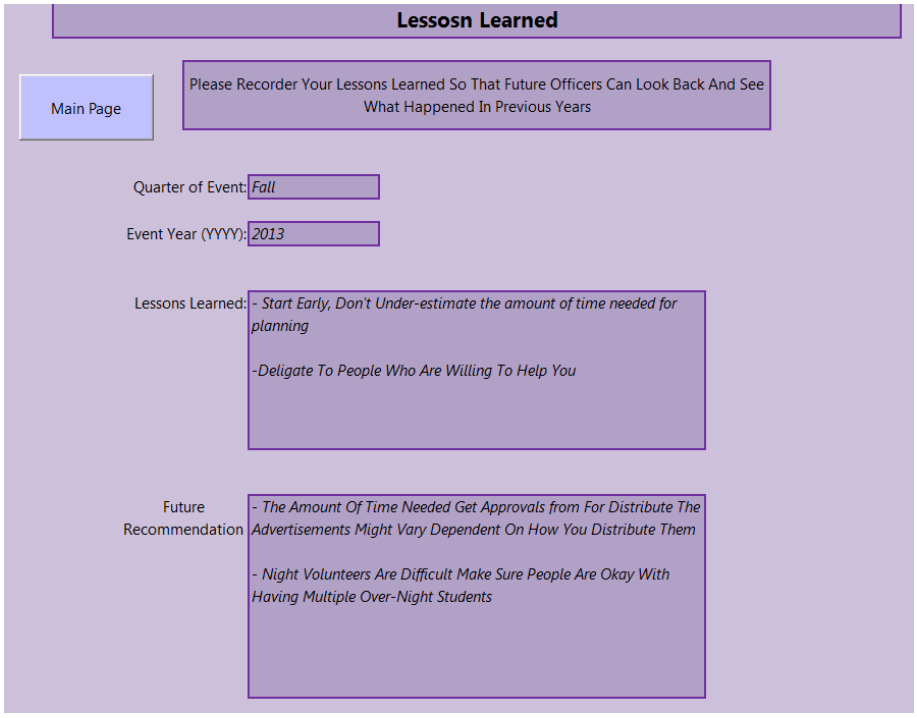
Expenses			
Expense	Budgeted Amount	Actual Expense	Difference
Decorations/Signs	$100.00	$0.00	-$100.00
Cost of Movie Food	$50.00	$0.00	-$50.00
Transportation	$500.00	$0.00	-$500.00
Event Funds	$500.00	$0.00	-$500.00

Income			
Income	Amount per Unit	No. of Units	Total Income
Students Total Paid	$10.00	0	$0.00
Donated Corporate Money	$0.00	0	$0.00
Lunch Money	$0.00	0	$0.00

Calculations	
Totals	Amount
Budget	$650.00
Expenses	$0.00
Income	$0.00
Under/Over Budget	$650.00
Actual Cost of Event:	$0.00

Figure 12: High School Shadow Money Summary

When the "Lessons Learned" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 13. This sheet is expected to be filled out after the event's completion. It allows the officer to reflect on the event before saving for future officers to look back and review.



Lessosn Learned

Main Page

Please Recorder Your Lessons Learned So That Future Officers Can Look Back And See What Happened In Previous Years

Quarter of Event: *Fall*

Event Year (YYYY): *2013*

Lessons Learned: *- Start Early, Don't Under-estimate the amount of time needed for planning*

-Deligate To People Who Are Willing To Help You

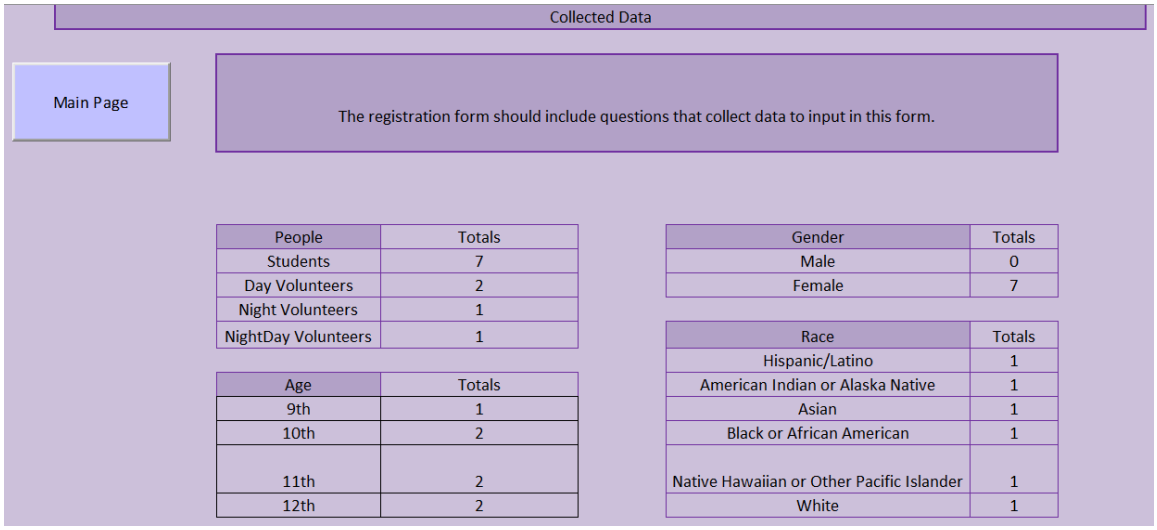
Future Recommendation: *- The Amount Of Time Needed Get Approvals from For Distribute The Advertisements Might Vary Dependent On How You Distribute Them*

- Night Volunteers Are Difficult Make Sure People Are Okay With Having Multiple Over-Night Students

Figure 13: High School Shadow Lessons Learned

When the "Summary of Data" button is clicked in Figure 4, a worksheet will appear with information shown in Figure 14. This page collected the following data from

the other worksheets and summarizes it onto this document. This allows the officer to understand the impact of their event and allows the officer to quickly summarize necessary information about the event.



People	Totals
Students	7
Day Volunteers	2
Night Volunteers	1
NightDay Volunteers	1

Age	Totals
9th	1
10th	2
11th	2
12th	2

Gender	Totals
Male	0
Female	7

Race	Totals
Hispanic/Latino	1
American Indian or Alaska Native	1
Asian	1
Black or African American	1
Native Hawaiian or Other Pacific Islander	1
White	1

Figure 14: High School Shadow Collected Data

ACCESS SYSTEM

CHECK-IN SYSTEM

The following access system was created for High School Shadow Check in process. It allows a student to be check-in very quickly and without hassle. Figure 15 shows the Check-In user interface before information is selected.

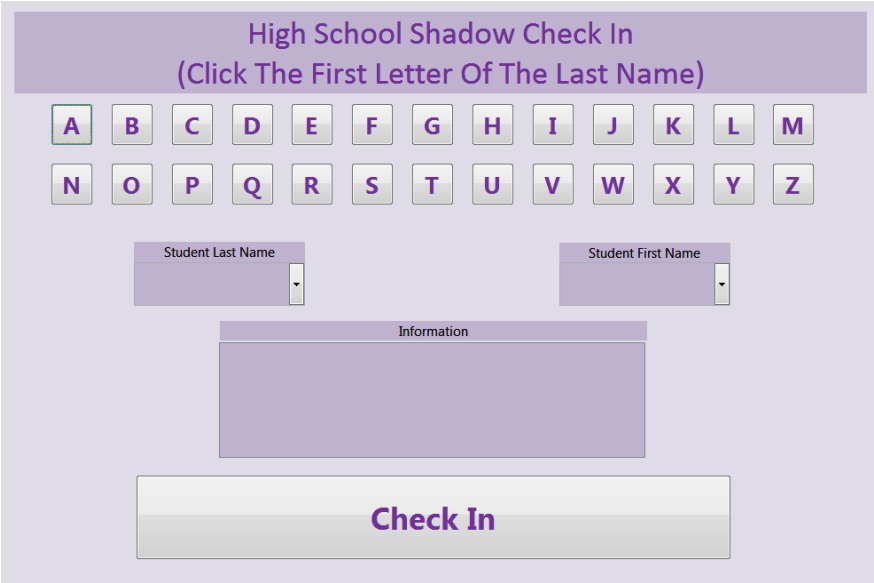


Figure 15: High School Shadow Check In System.

In Figure 16, the user has selected the student based upon their first letter of their last name, then their last name and then their first name. When all three of those have been selected the system outputs the attendee's shadow information. This allows the user to quickly tell the attendee their shadows information without difficulty.

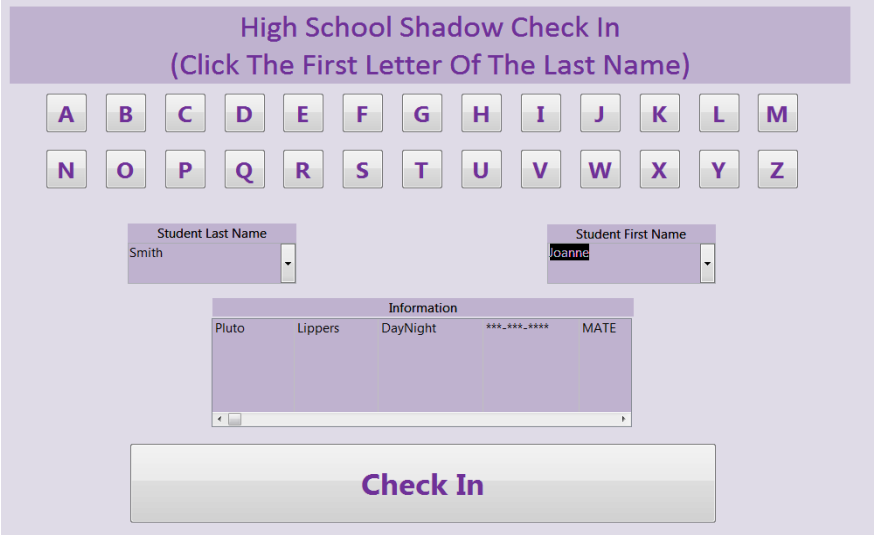


Figure 16: High School Shadow Check In System (Post)

VOLUNTEER INFORMATION

The following Access system allows the user to easily find the volunteer's name and their information. Figure 17 is the view of the blank database.

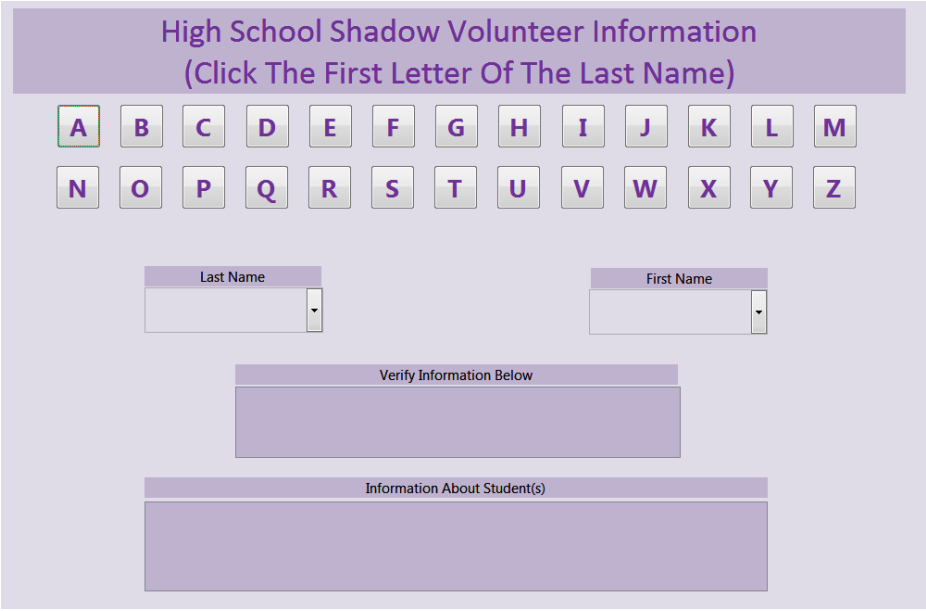


Figure 17: High School Shadow Volunteer Information

In Figure 18, the user has selected the volunteer's information. The information that is output is both the volunteer's information, which needs to be verified, and all of the shadow's information. This Access database allows the user to easily confirm the volunteer's information and give the volunteer their shadow's information.

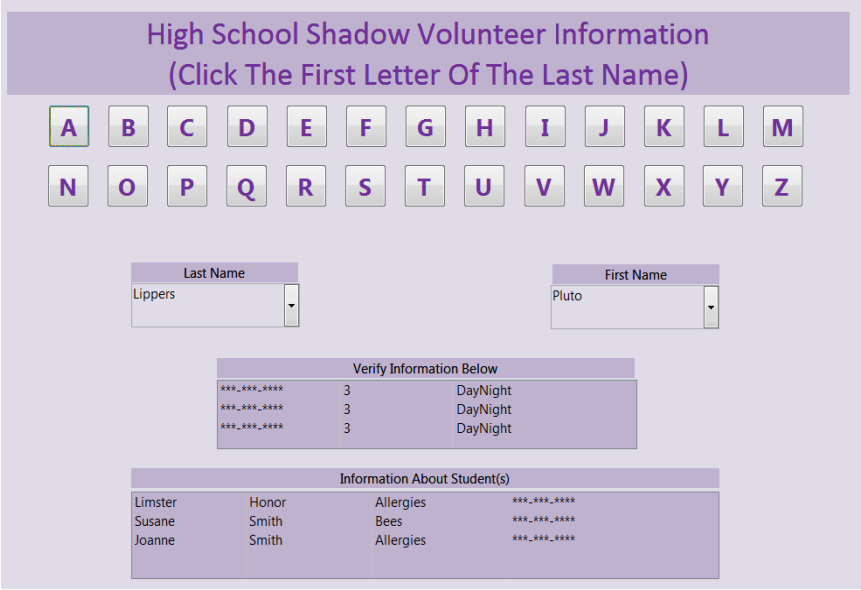


Figure 18: High School Shadow Volunteer Information (Post)

BUILDING AN ENGINEER DAY

Building an Engineer Day is a single day event and the main focus is being able to organize clubs and students during the event.

EXCEL DOCUMENT

In order to make the excel document easy to understand, a "Main Page" was created. This main page can be seen in Figure 19. On the main page the user can click any of the buttons and a new sheet will appear.

These sheets also have buttons that say “Main Page” which when clicked with close their current worksheet and open the main page shown in Figure 19. This excel document is very similar to High School Shadow’s excel document, the only difference being the data that it stores.

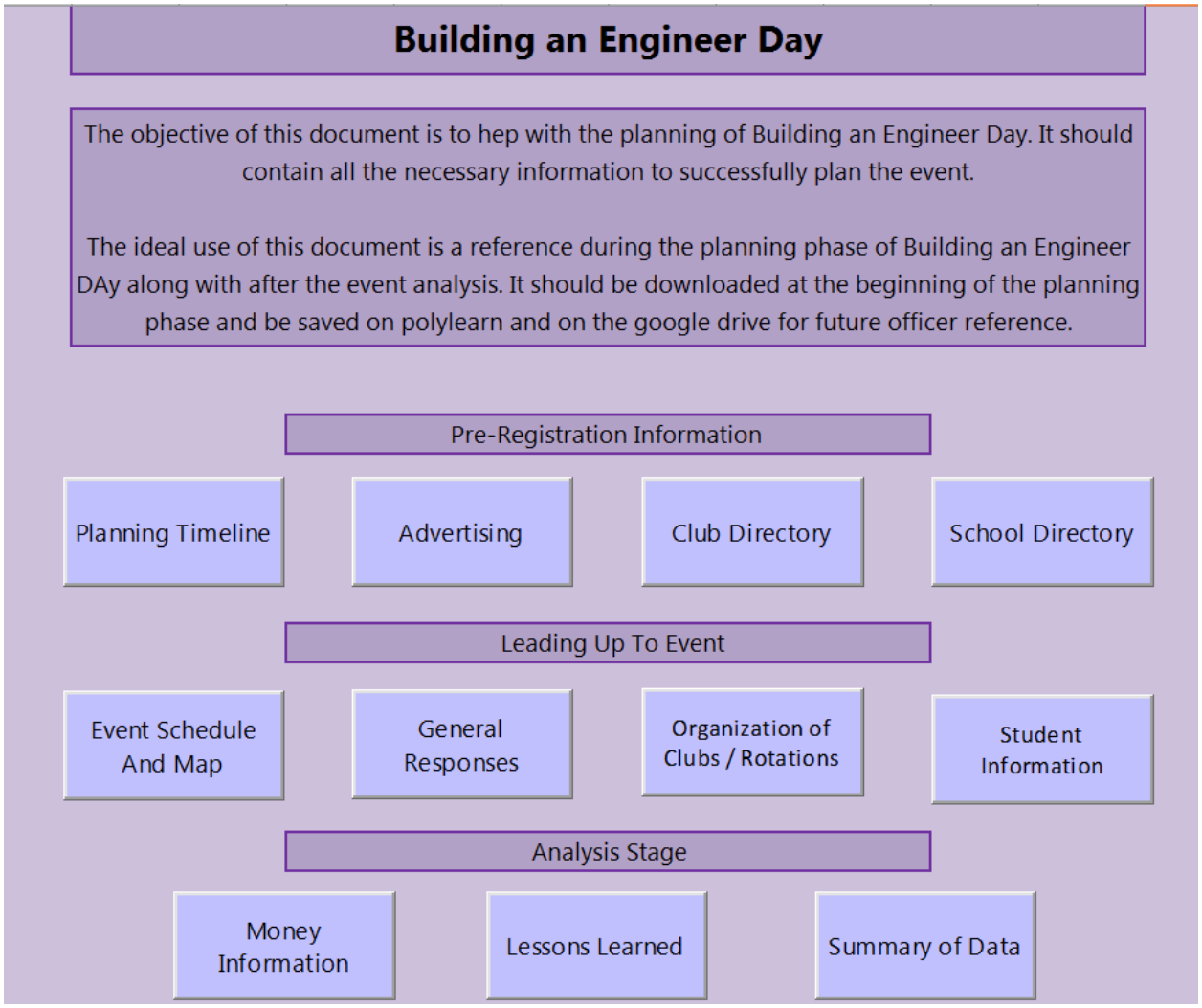
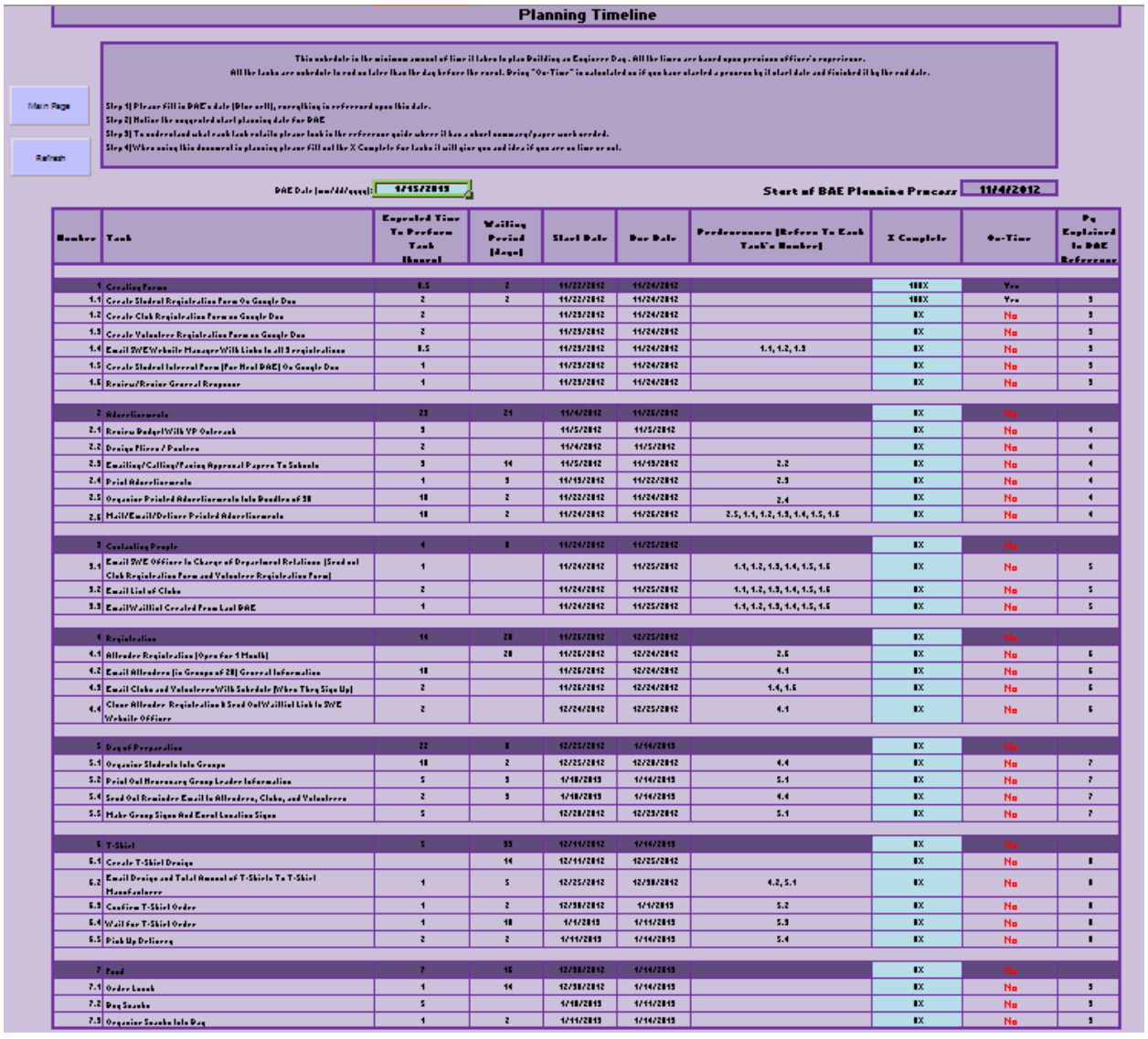


Figure 19: Building an Engineer Day Main Page

When the “Planning Timeline” button is clicked in Figure 19, a worksheet will appear with information shown in Figure 20. This worksheet shows all of the tasks that need to occur for Building an Engineer Day. The timeline was created with input from previous Building An Engineer Day officers, and their opinion on how long tasks took.

This worksheet works back from the date of the actual event and gives the officer the start date. This timeline is expected to be used continuously throughout the planning process. The officer should track their progress under the "% Complete" column. The "On-Time" column will analyze the expected start date, due date and % Complete to give the officer feedback on whether or not they are on schedule.



Planning Timeline

This schedule is the minimum amount of time it takes to plan Building an Engineer Day. All the times are based upon previous officer's experience.
All the tasks are schedule to end no later than the day before the event. Being "On-Time" is calculated on if you have started a process by it start date and finished it by the end date.

Main Page

Refresh

Step 1| Please fill in BAE's date |Blue cell|, everything is referenced upon this date.
Step 2| Utilize the suggested start planning date for BAE
Step 3| To understand what each task entails please look in the reference guide where it has a short summary/paper work needed.
Step 4|When using this document in planning please fill out the % Complete for tasks it will give you and idea if you are on time or not.

BAE Date |mm/dd/yyyy|: 1/15/2013

Start of BAE Planning Process: 11/4/2012

Number	Task	Expected Time To Perform Task (hours)	Waiting Period (days)	Start Date	Due Date	Predecessors (Refers To Each Task's Number)	% Complete	On-Time	Pg Explained In BAE Reference
1	Creating Forms	8.5	2	11/22/2012	11/24/2012		100%	Yes	
1.1	Create Student Registration Form On Google Doc	2	2	11/22/2012	11/24/2012		100%	Yes	3
1.2	Create Club Registration Form on Google Doc	2		11/23/2012	11/24/2012		0%	No	3
1.3	Create Volunteer Registration Form on Google Doc	2		11/23/2012	11/24/2012		0%	No	3
1.4	Email SWE Website Manager With Links to all 3 registrations	0.5		11/23/2012	11/24/2012	1.1, 1.2, 1.3	0%	No	3
1.5	Create Student Interest Form |For Host BAE| On Google Doc	1		11/23/2012	11/24/2012		0%	No	3
1.6	Review/Revise General Response	1		11/23/2012	11/24/2012		0%	No	3
2	Advertisements	23	24	11/4/2012	11/25/2012		0%	No	
2.1	Review Budget With VP Outreach	3		11/5/2012	11/5/2012		0%	No	4
2.2	Design Flyers / Posters	2		11/4/2012	11/5/2012		0%	No	4
2.3	Emailing/Calling/Faxing Approval Papers To Schools	3	14	11/5/2012	11/19/2012	2.2	0%	No	4
2.4	Print Advertisements	1	3	11/19/2012	11/22/2012	2.3	0%	No	4
2.5	Organize Printed Advertisements Into Bundles of 50	10	2	11/22/2012	11/24/2012	2.4	0%	No	4
2.6	Mail/Email/Deliver Printed Advertisements	10	2	11/24/2012	11/25/2012	2.5, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6	0%	No	4
3	Contacting People	4	0	11/24/2012	11/25/2012		0%	No	
3.1	Email SWE Officers In Charge of Departmental Relations |Send out Club Registration Form and Volunteer Registration Form|	1		11/24/2012	11/25/2012	1.1, 1.2, 1.3, 1.4, 1.5, 1.6	0%	No	5
3.2	Email List of Clubs	2		11/24/2012	11/25/2012	1.1, 1.2, 1.3, 1.4, 1.5, 1.6	0%	No	5
3.3	Email Waitlist Created From Last BAE	1		11/24/2012	11/25/2012	1.1, 1.2, 1.3, 1.4, 1.5, 1.6	0%	No	5
4	Registration	14	28	11/25/2012	12/25/2012		0%	No	
4.1	Allocate Registration |Open for 1 Month|		28	11/25/2012	12/24/2012	2.6	0%	No	6
4.2	Email Attendees |in Groups of 20| General Information	10		11/25/2012	12/24/2012	4.1	0%	No	6
4.3	Email Clubs and Volunteers With Schedule |When They Sign Up|	2		11/25/2012	12/24/2012	1.4, 1.5	0%	No	6
4.4	Close Attendee Registration & Send Out Waitlist Link to SWE Website Officers	2		12/24/2012	12/25/2012	4.1	0%	No	6
5	Day of Preparation	22	8	12/25/2012	1/14/2013		0%	No	
5.1	Organize Students Into Groups	10	2	12/25/2012	12/28/2012	4.4	0%	No	7
5.2	Print Out Necessary Group Leader Information	5	3	1/10/2013	1/14/2013	5.1	0%	No	7
5.4	Send Out Reminder Email to Attendees, Clubs, and Volunteers	2	3	1/10/2013	1/14/2013	4.4	0%	No	7
5.5	Make Group Signs And Enroll Location Signs	5		12/28/2012	12/25/2012	5.1	0%	No	7
6	T-Shirt	5	33	12/11/2012	1/14/2013		0%	No	
6.1	Create T-Shirt Design		14	12/11/2012	12/25/2012		0%	No	8
6.2	Email Design and Total Amount of T-Shirts To T-Shirt Manufacturer	1	5	12/25/2012	12/30/2012	4.2, 5.1	0%	No	8
6.3	Confirm T-Shirt Order	1	2	12/30/2012	1/14/2013	5.2	0%	No	8
6.4	Wait for T-Shirt Order	1	10	1/4/2013	1/14/2013	5.3	0%	No	8
6.5	Pick Up Delivery	2	2	1/14/2013	1/14/2013	5.4	0%	No	8
7	Food	7	15	12/30/2012	1/14/2013		0%	No	
7.1	Order Lunch	1	14	12/30/2012	1/14/2013		0%	No	9
7.2	Buy Snacks	5		1/10/2013	1/14/2013		0%	No	9
7.3	Organize Snacks Into Bag	1	2	1/14/2013	1/14/2013		0%	No	9

Figure 20: Building An Engineer Day Planning Timeline

When the "Advertisements" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 21. This worksheet explains the process of creating advertisements, along with an example from a previous Building an Engineer Day.

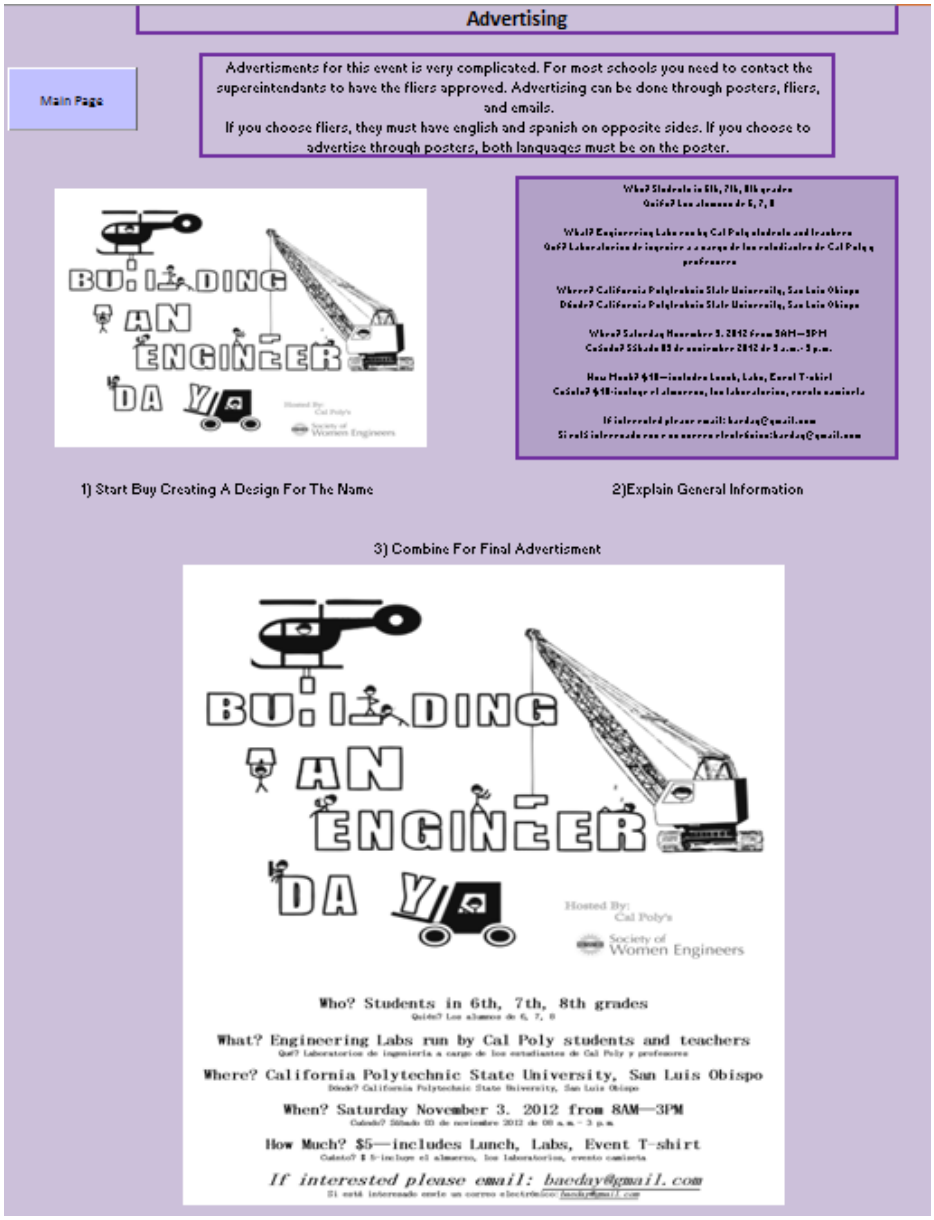
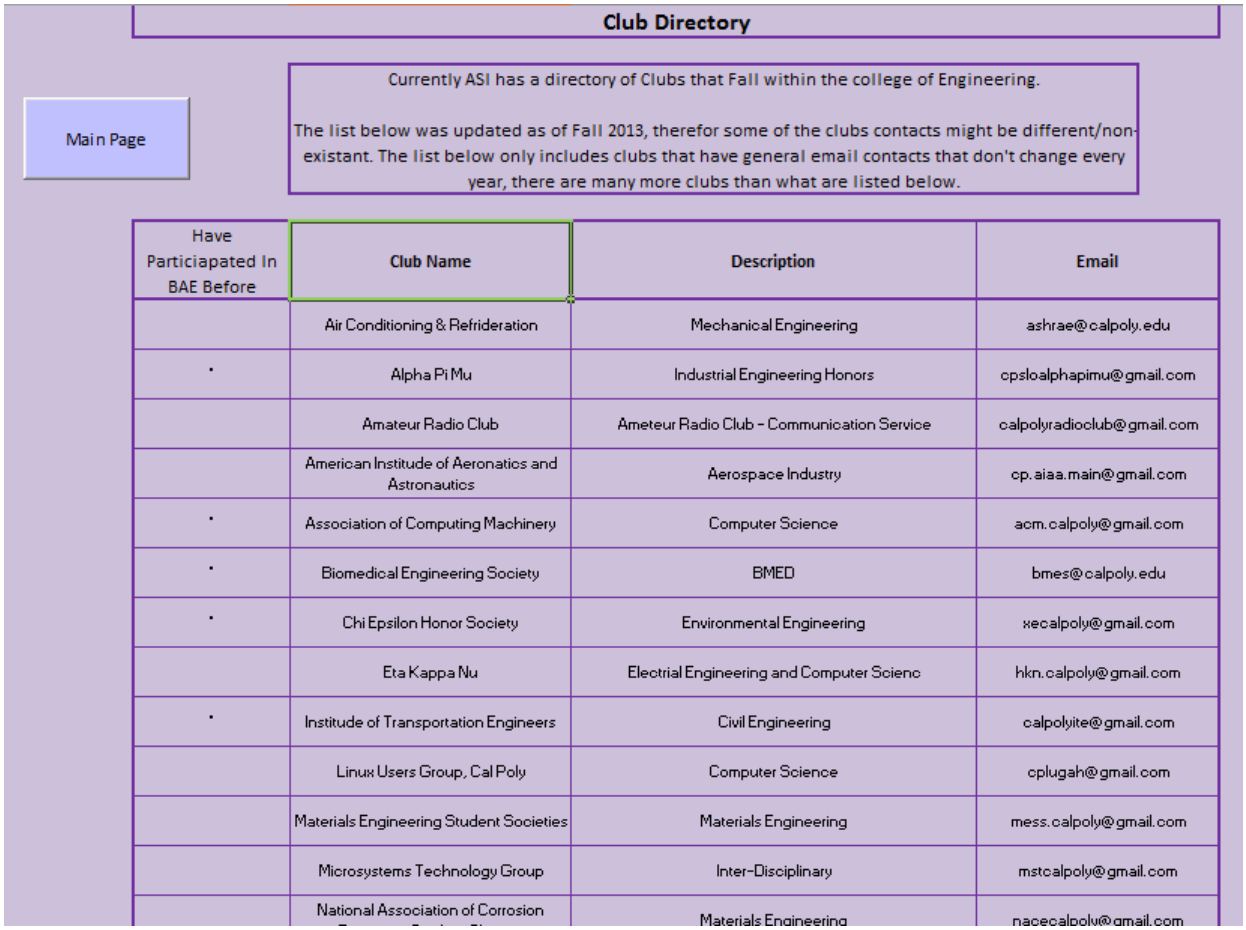


Figure 21: Building An Engineer Day Advertising

When the "Club Directory" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 22. This document houses all the clubs that have a

"general" email address. This means that the email account is not dependent upon a person, they tend to be general account passed from officer to officer. The document also indicates if the clubs has even participated in Building an Engineer Day before.



Club Directory

Main Page

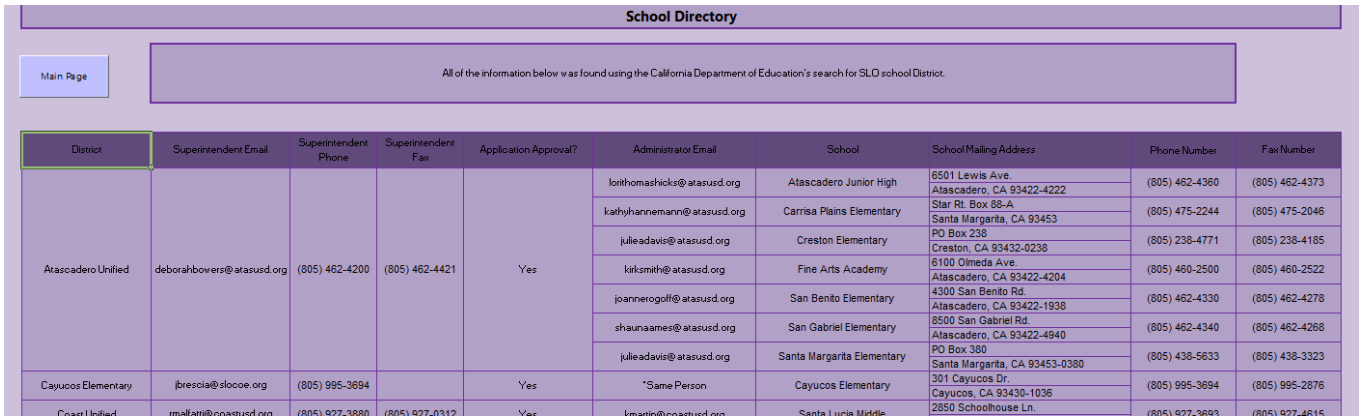
Currently ASI has a directory of Clubs that Fall within the college of Engineering.

The list below was updated as of Fall 2013, therefor some of the clubs contacts might be different/non-existant. The list below only includes clubs that have general email contacts that don't change every year, there are many more clubs than what are listed below.

Have Particiapated In BAE Before	Club Name	Description	Email
	Air Conditioning & Refrideration	Mechanical Engineering	ashrae@calpoly.edu
·	Alpha Pi Mu	Industrial Engineering Honors	cpsloalphapimu@gmail.com
	Amateur Radio Club	Ameteur Radio Club - Communication Service	calpolyradioclub@gmail.com
	American Institude of Aeronatics and Astronautics	Aerospace Industry	cp.aiaa.main@gmail.com
·	Association of Computing Machinery	Computer Science	acm.calpoly@gmail.com
·	Biomedical Engineering Society	BMED	bmes@calpoly.edu
·	Chi Epsilon Honor Society	Environmental Engineering	xecalpoly@gmail.com
	Eta Kappa Nu	Electrial Engineering and Computer Scienc	hkn.calpoly@gmail.com
·	Institude of Transportation Engineers	Civil Engineering	calpolyite@gmail.com
	Linux Users Group, Cal Poly	Computer Science	cplugah@gmail.com
	Materials Engineering Student Societies	Materials Engineering	mess.calpoly@gmail.com
	Microsystems Technology Group	Inter-Disciplinary	mstcalpoly@gmail.com
	National Association of Corrosion	Materials Engineering	nacecalpoly@gmail.com

Figure 22: Building An Engineer Day Club Directory

When the "School Directory" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 23. This document houses all the information for local superintendents, along with principles from every middle school and junior high school. This list was created so that officers wouldn't need to spend hours looking for it every year, since mailing addresses and emails are "general" email accounts.



School Directory

Main Page

All of the information below was found using the California Department of Education's search for SLO school District.

District	Superintendent Email	Superintendent Phone	Superintendent Fax	Application Approval?	Administrator Email	School	School Mailing Address	Phone Number	Fax Number
Atascadero Unified	deborahbowers@atasusd.org	(805) 462-4200	(805) 462-4421	Yes	lorithomashicks@atasusd.org	Atascadero Junior High	6501 Lewis Ave. Atascadero, CA 93422-4222	(805) 462-4360	(805) 462-4373
					kathyhannemann@atasusd.org	Carrisa Plains Elementary	Star Rt. Box 88-A Santa Margarita, CA 93453	(805) 475-2244	(805) 475-2046
					julieadavis@atasusd.org	Creston Elementary	PO Box 238 Creston, CA 93432-0238	(805) 238-4771	(805) 238-4185
					kirksmith@atasusd.org	Fine Arts Academy	6100 Olmeda Ave. Atascadero, CA 93422-4204	(805) 460-2500	(805) 460-2522
					joannerogoff@atasusd.org	San Benito Elementary	4300 San Benito Rd. Atascadero, CA 93422-1938	(805) 462-4330	(805) 462-4278
					shaunaames@atasusd.org	San Gabriel Elementary	8500 San Gabriel Rd. Atascadero, CA 93422-4940	(805) 462-4340	(805) 462-4268
					julieadavis@atasusd.org	Santa Margarita Elementary	PO Box 380 Santa Margarita, CA 93453-0380	(805) 438-5633	(805) 438-3323
Cayucos Elementary	jbrescia@slocoe.org	(805) 995-3694		Yes	*Same Person	Cayucos Elementary	301 Cayucos Dr. Cayucos, CA 93430-1036	(805) 995-3694	(805) 995-2876
Coast Unified	rmalfatti@coastusd.org	(805) 927-3880	(805) 927-0312	Yes	kmartin@coastusd.org	Santa Lucia Middle	2850 Schoolhouse Ln.	(805) 927-3693	(805) 927-4615

Figure 23: Building An Engineer Day School Directory

When the "Event Schedule/Map" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 24. This schedule can be changed or kept the same based upon the officer's preference; however having the information in one place allows the officer to easily send the information to others if needed.

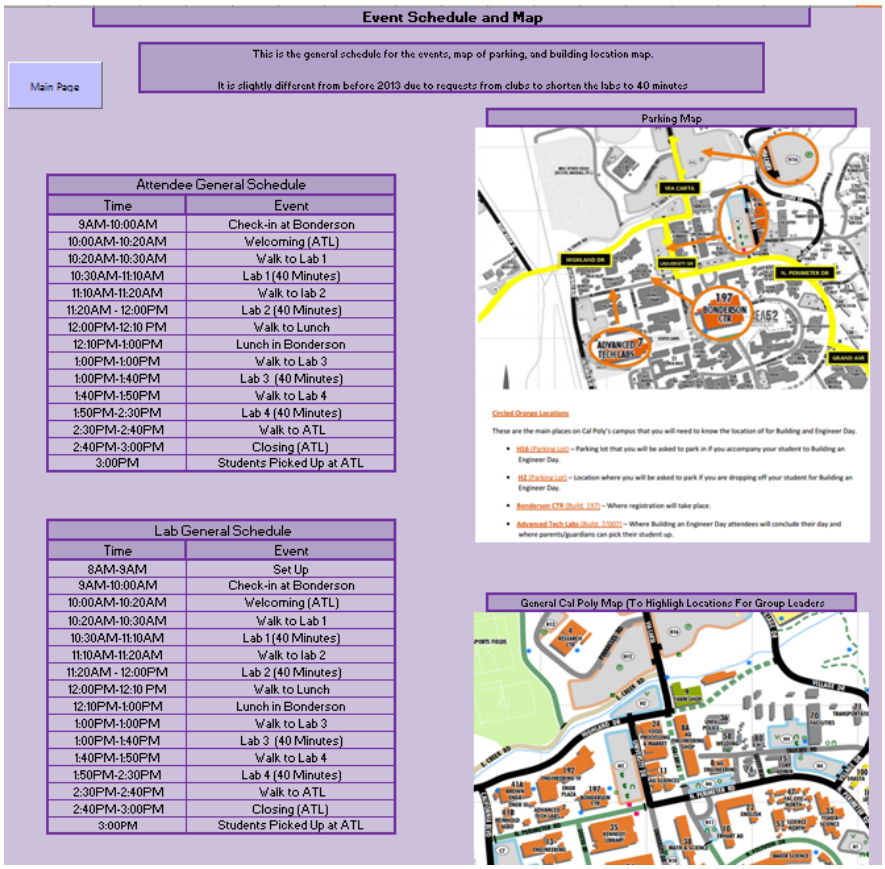


Figure 24: Building An Engineer Day Event Schedule and Map

When the "General Responses" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 25. In order to reduce the amount of time dedicated to emails, it is suggested that each officer create 7 "General Responses" that can be copied and sent out in a matter of seconds. Emailing attendees, volunteers and clubs takes a large amount of the officer's time, with creating general responses the

amount of time spent writing emails can be reduced.

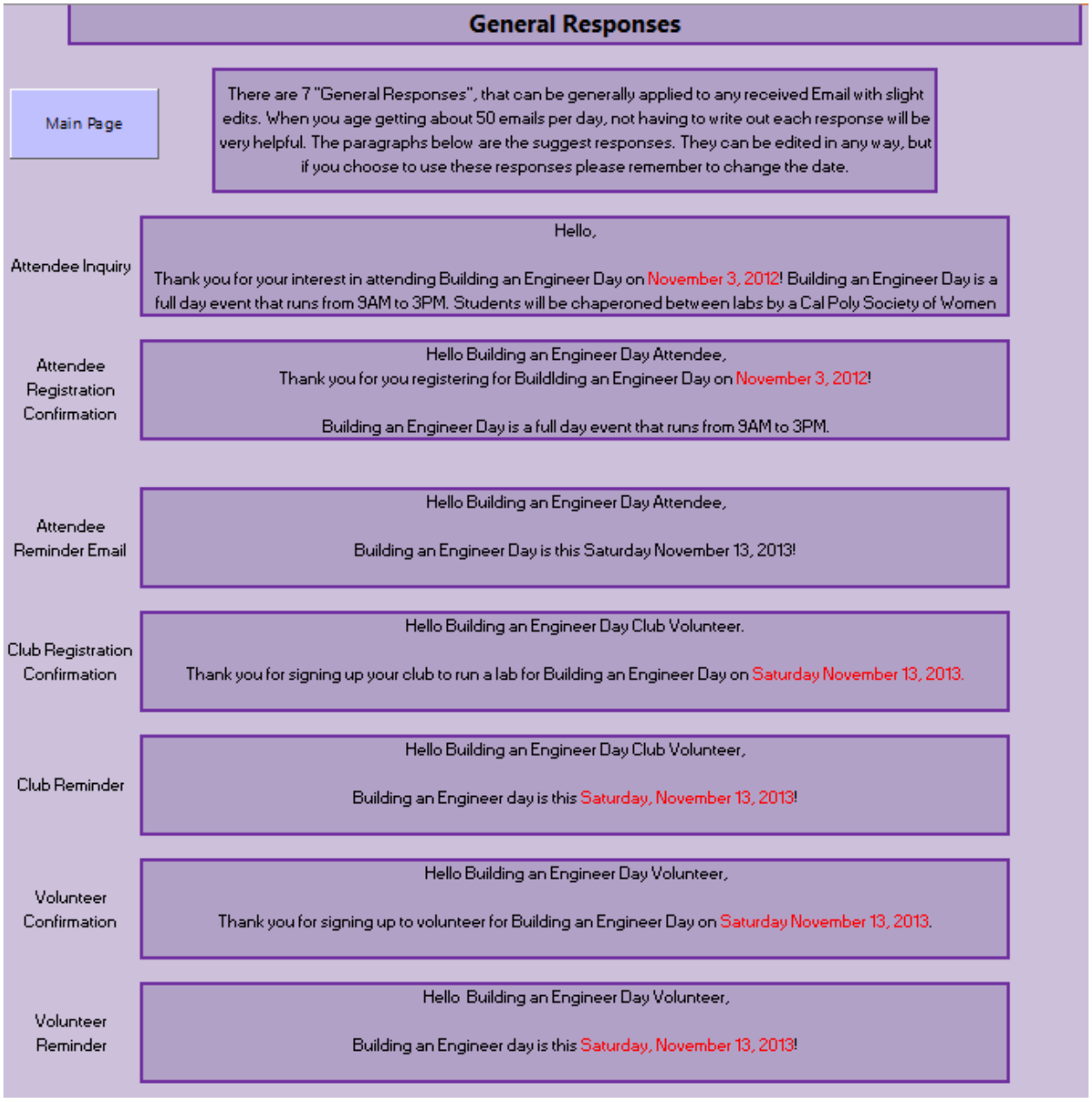
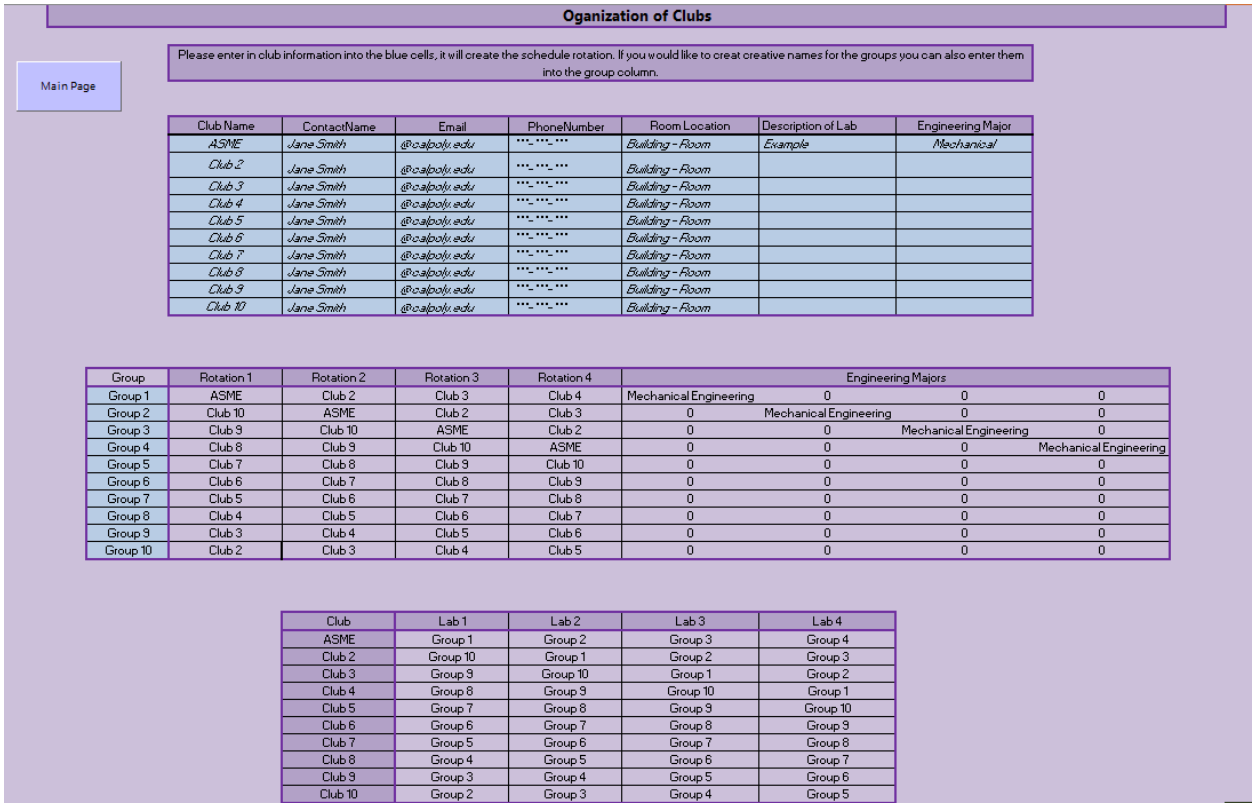


Figure 25: Building An Engineer Day General Responses

When the "Organization of Clubs/Rotations" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 26. This worksheet houses data of all the clubs participating in Building an Engineer Day. This worksheet is essential because it is a table that is transferred into the Microsoft Access document.



Organization of Clubs

Main Page

Please enter in club information into the blue cells, it will create the schedule rotation. If you would like to creat creative names for the groups you can also enter them into the group column.

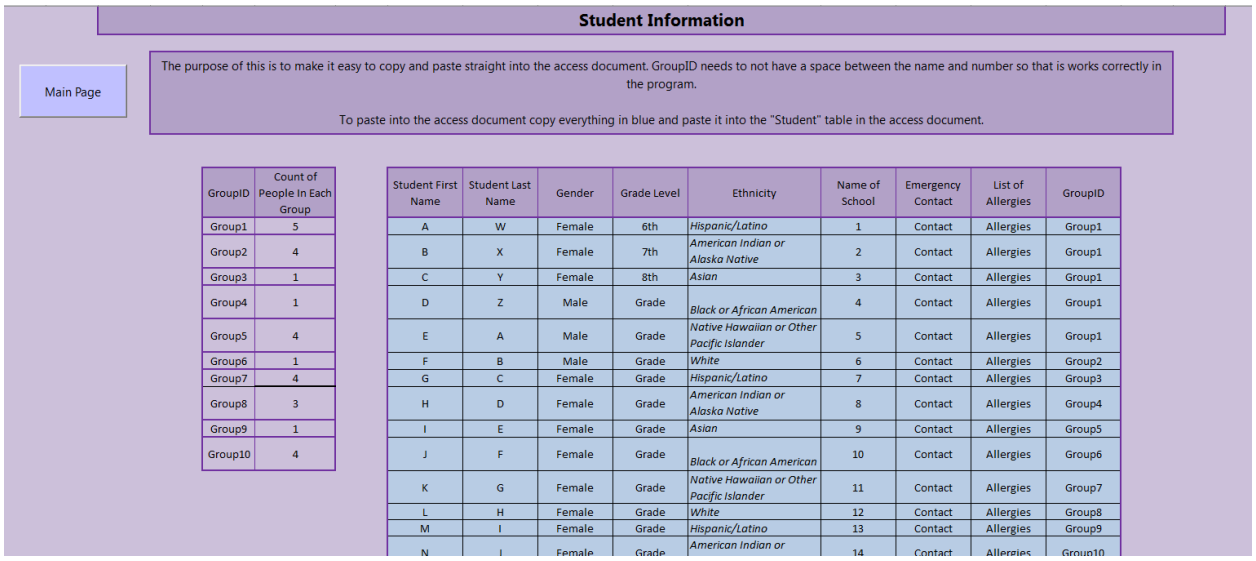
Club Name	ContactName	Email	PhoneNumber	Room Location	Description of Lab	Engineering Major
ASME	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*	*Example*	*Mechanical*
Club 2	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		
Club 3	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		
Club 4	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		
Club 5	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		
Club 6	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		
Club 7	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		
Club 8	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		
Club 9	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		
Club 10	*Jane Smith*	*@calpoly.edu*	****-***-****	*Building - Room*		

Group	Rotation 1	Rotation 2	Rotation 3	Rotation 4	Engineering Majors			
Group 1	ASME	Club 2	Club 3	Club 4	Mechanical Engineering	0	0	0
Group 2	Club 10	ASME	Club 2	Club 3	0	Mechanical Engineering	0	0
Group 3	Club 9	Club 10	ASME	Club 2	0	0	Mechanical Engineering	0
Group 4	Club 8	Club 9	Club 10	ASME	0	0	0	Mechanical Engineering
Group 5	Club 7	Club 8	Club 9	Club 10	0	0	0	0
Group 6	Club 6	Club 7	Club 8	Club 9	0	0	0	0
Group 7	Club 5	Club 6	Club 7	Club 8	0	0	0	0
Group 8	Club 4	Club 5	Club 6	Club 7	0	0	0	0
Group 9	Club 3	Club 4	Club 5	Club 6	0	0	0	0
Group 10	Club 2	Club 3	Club 4	Club 5	0	0	0	0

Club	Lab 1	Lab 2	Lab 3	Lab 4
ASME	Group 1	Group 2	Group 3	Group 4
Club 2	Group 10	Group 1	Group 2	Group 3
Club 3	Group 9	Group 10	Group 1	Group 2
Club 4	Group 8	Group 9	Group 10	Group 1
Club 5	Group 7	Group 8	Group 9	Group 10
Club 6	Group 6	Group 7	Group 8	Group 9
Club 7	Group 5	Group 6	Group 7	Group 8
Club 8	Group 4	Group 5	Group 6	Group 7
Club 9	Group 3	Group 4	Group 5	Group 6
Club 10	Group 2	Group 3	Group 4	Group 5

Figure 26: Building An Engineer Day Organization of Clubs

When the "Student Information" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 27. This worksheet houses data of all the student attendees participating in Building an Engineer Day. This worksheet is essential because it is a table that is transferred into the Microsoft Access document.



Student Information

Main Page

The purpose of this is to make it easy to copy and paste straight into the access document. GroupID needs to not have a space between the name and number so that is works correctly in the program.

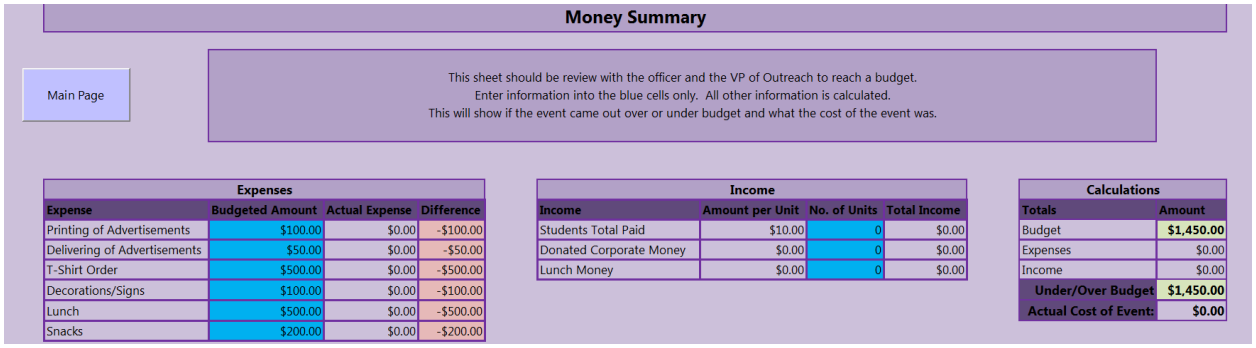
To paste into the access document copy everything in blue and paste it into the "Student" table in the access document.

GroupID	Count of People In Each Group
Group1	5
Group2	4
Group3	1
Group4	1
Group5	4
Group6	1
Group7	4
Group8	3
Group9	1
Group10	4

Student First Name	Student Last Name	Gender	Grade Level	Ethnicity	Name of School	Emergency Contact	List of Allergies	GroupID
A	W	Female	6th	*Hispanic/Latino*	1	Contact	Allergies	Group1
B	X	Female	7th	*American Indian or Alaska Native*	2	Contact	Allergies	Group1
C	Y	Female	8th	*Asian*	3	Contact	Allergies	Group1
D	Z	Male	Grade	*Black or African American*	4	Contact	Allergies	Group1
E	A	Male	Grade	*Native Hawaiian or Other Pacific Islander*	5	Contact	Allergies	Group1
F	B	Male	Grade	*White*	6	Contact	Allergies	Group2
G	C	Female	Grade	*Hispanic/Latino*	7	Contact	Allergies	Group3
H	D	Female	Grade	*American Indian or Alaska Native*	8	Contact	Allergies	Group4
I	E	Female	Grade	*Asian*	9	Contact	Allergies	Group5
J	F	Female	Grade	*Black or African American*	10	Contact	Allergies	Group6
K	G	Female	Grade	*Native Hawaiian or Other Pacific Islander*	11	Contact	Allergies	Group7
L	H	Female	Grade	*White*	12	Contact	Allergies	Group8
M	I	Female	Grade	*Hispanic/Latino*	13	Contact	Allergies	Group9
N	J	Female	Grade	*American Indian or*	14	Contact	Allergies	Group10

Figure 27: Building An Engineer Day Student Information

When the "Money Information" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 28. These are basic tables that will help the officer stay aware of the amount of money that they are expected to spend. This sheet allows the officer to understand where all the money for the event is being spent.



Money Summary

Main Page

This sheet should be review with the officer and the VP of Outreach to reach a budget.
Enter information into the blue cells only. All other information is calculated.
This will show if the event came out over or under budget and what the cost of the event was.

Expenses			
Expense	**Budgeted Amount**	**Actual Expense**	**Difference**
Printing of Advertisements	$100.00	$0.00	-$100.00
Delivering of Advertisements	$50.00	$0.00	-$50.00
T-Shirt Order	$500.00	$0.00	-$500.00
Decorations/Signs	$100.00	$0.00	-$100.00
Lunch	$500.00	$0.00	-$500.00
Snacks	$200.00	$0.00	-$200.00

Income			
Income	**Amount per Unit**	**No. of Units**	**Total Income**
Students Total Paid	$10.00	0	$0.00
Donated Corporate Money	$0.00	0	$0.00
Lunch Money	$0.00	0	$0.00

Calculations	
Totals	**Amount**
Budget	**$1,450.00**
Expenses	$0.00
Income	$0.00
Under/Over Budget	**$1,450.00**
Actual Cost of Event:	**$0.00**

Figure 28: Building An Engineer Day Money Summary

When the "Lessons Learned" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 29. This sheet is expected to be filled out after

the event's completion. It allows the officer to reflect on the event before saving for future officers to look back and review.

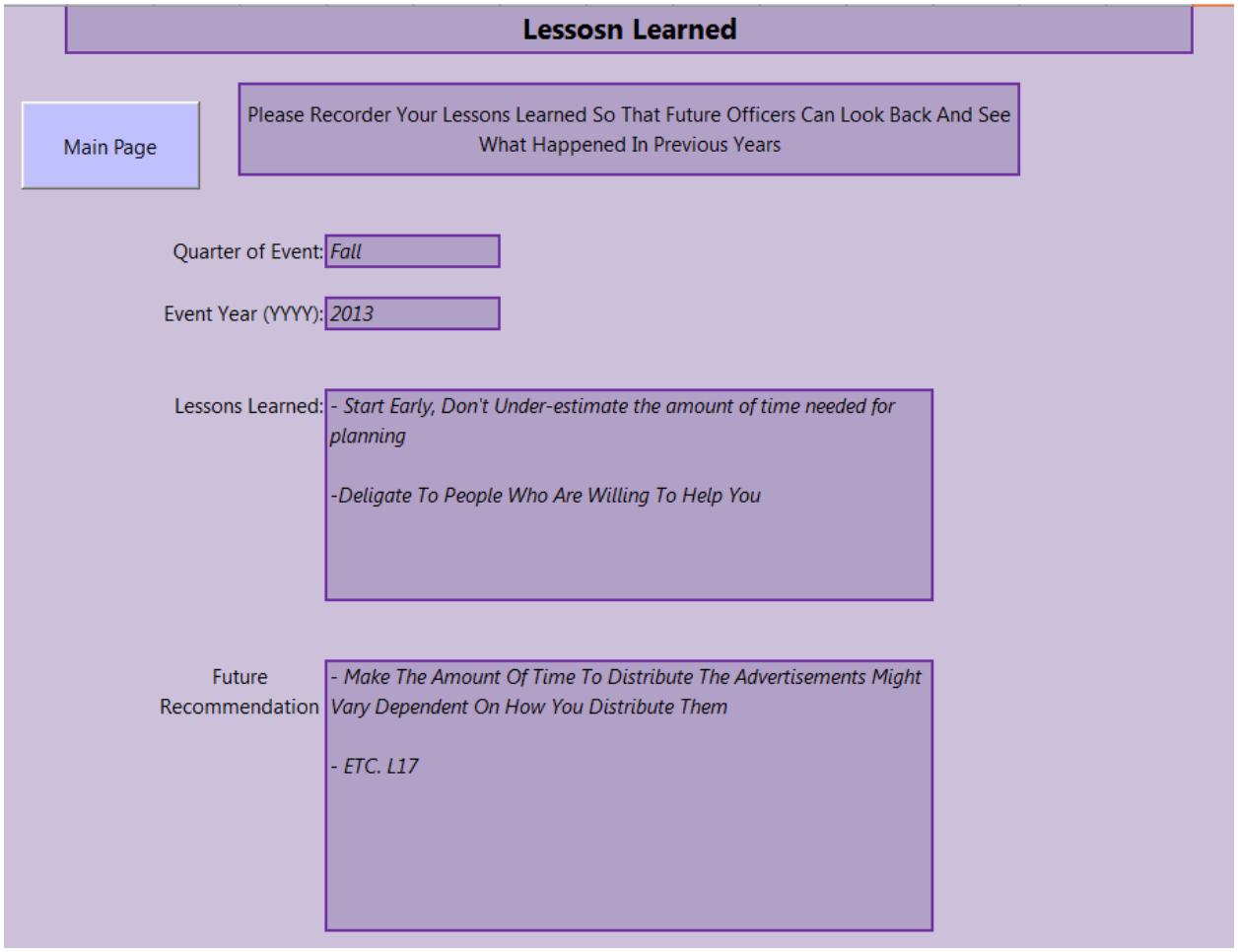


Figure 29: Building An Engineer Day Lessons Learned

When the "Summary of Data" button is clicked in Figure 19, a worksheet will appear with information shown in Figure 30. This page collected the following data from the other worksheets and summarizes it onto this document. This allows the officer to understand the impact of their event and allows the officer to quickly summarize necessary information about the event.

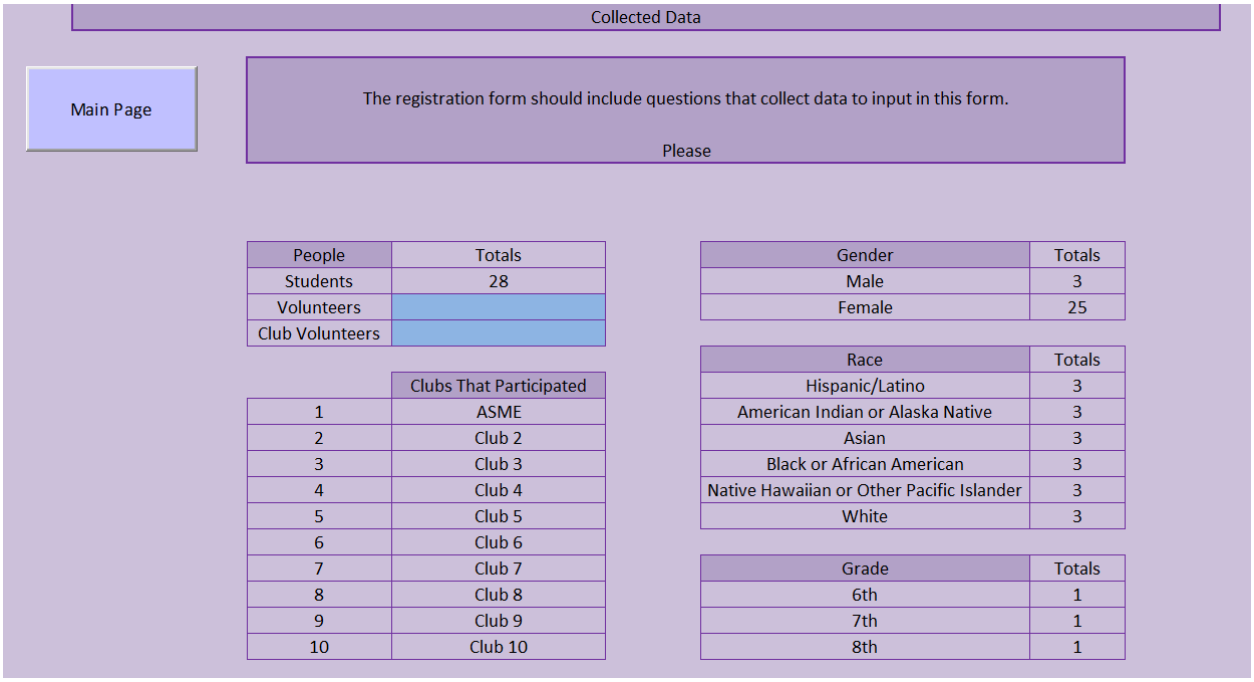


Figure 30: Building An Engineer Day Collected Data

ACCESS SYTEM

CHECK IN

The following access system was created for Building an Engineer Day Check in process. It allows a student to be check-in very quickly and without hassle. Figure 31 shows the Check-In user interface before information is selected.

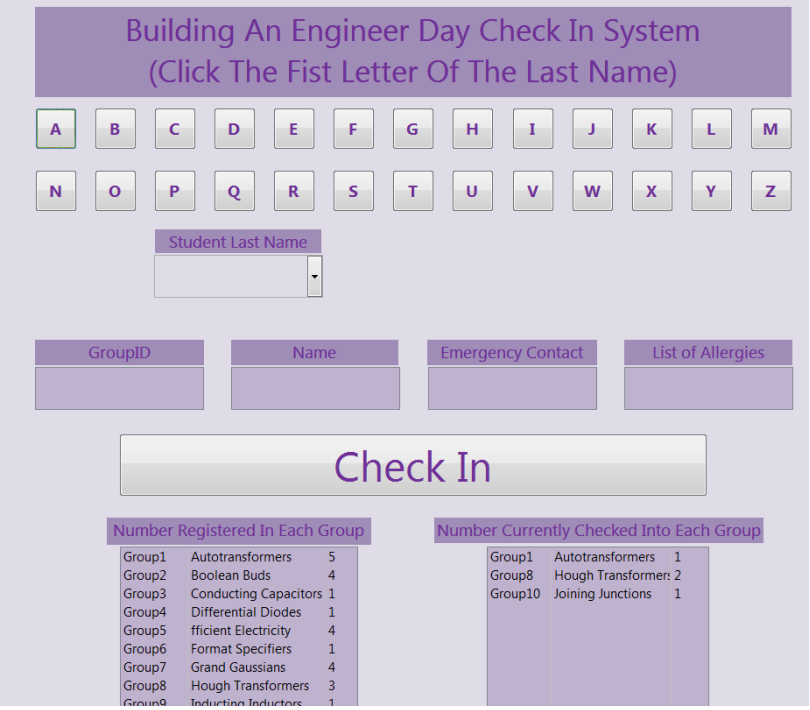


Figure 31: Building An Engineer Day Check In System

In Figure 32, the user has selected the student based upon their first letter of their last name, then their last name and then their first name. When all three of those have been selected the system outputs the attendee's shadow information. This allows the user to quickly tell the attendee their shadows information without difficulty.

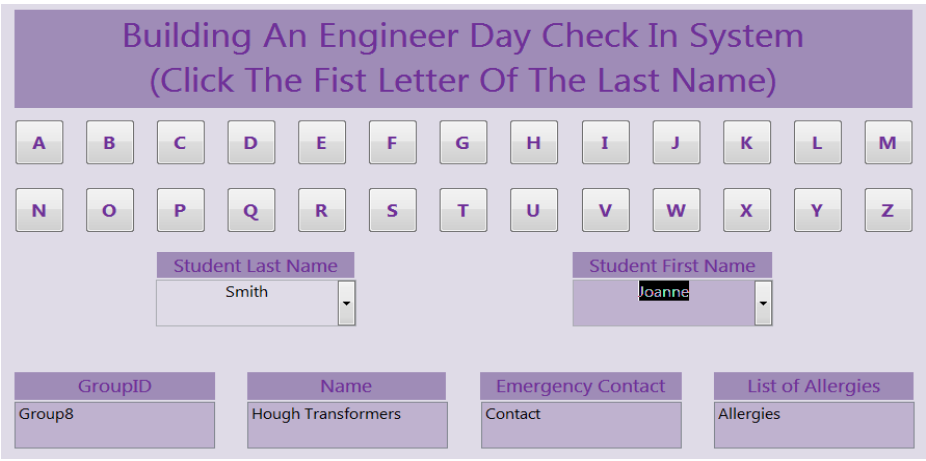


Figure 32: Building An Engineer Day Check In (Post)

During Building an Engineer Day it is very important to be able to locate students throughout the event. Figure 33, shows the blank Access form that can be used in order to search for any student depending upon which rotation they are currently in.

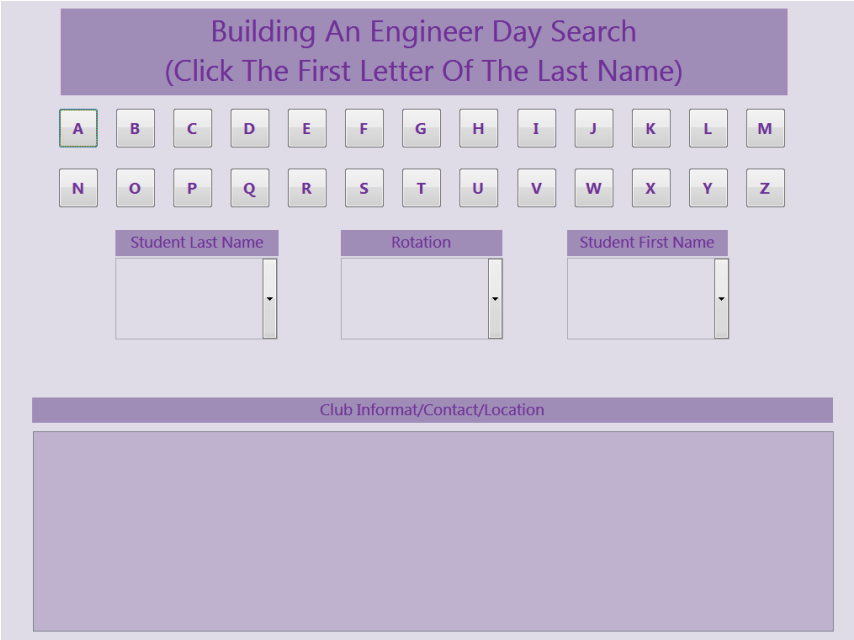


Figure 33: Building An Engineer Day Location System

In Figure 34, the user has entered in the student information along with the rotation. The information that is displayed shows the student's group name along with the club's contact and the club's phone number. This allows the user to quickly be able to contact any club to locate an attendee throughout the event.

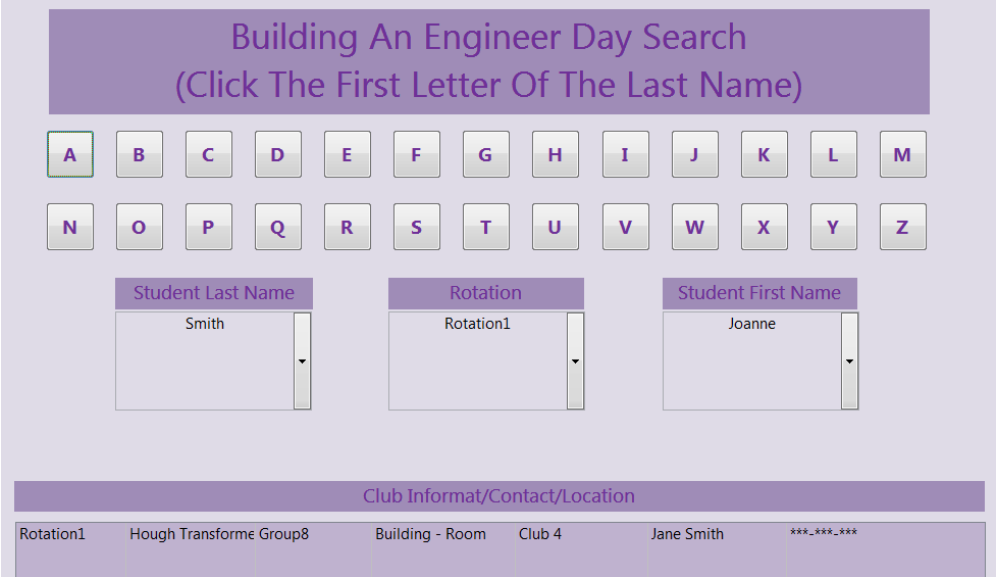


Figure 34: Building An Engineer Day Location System (Post)

SURVEY

Building an Engineer Day and High School Shadow don't currently distribute a survey, however they do collect information on their online signup sheets. Instead of creating a follow up survey, the suggestion is to create questions that can be analyzed in Excel documents. These questions include ethnicity, age and gender. If these three are included with the initial signup sheet, the officer won't need to analyze surveys; it will already be sorted and organized during the initial signup.

CHECK (VALIDATION OF THE SYSTEM REQUIREMENTS)

Microsoft Access and Microsoft Excel working together have been able to create solution to all of the original requirements. Microsoft Excel has created a single source of data the can be used during the planning of the event and Microsoft Access has created a database that can be used during the event.

The following five requirements were:

1. Reduce Time Commitment (Officer)
    - High School Shadow and Building an Engineer Day now have a guideline and data in one file that will help reduce the amount of time each officer spends on the event.
2. Reduce Variability In Cost
    - Timelines have been created and if they are followed, processes that were previously expedited won't be anymore.
3. Record Event Demographics (Club Expectations)
    - High School Shadow and Building an Engineer Day now have worksheets that analyze and report out demographic data. The worksheets will aid in summarizing large amounts of data into a summary worksheet.
4. Help Meet Event Expectations
    - Through creating of the Microsoft Access database, the program should be able to run easier and without difficulty.
5. Remove Uncertainty From Planning Process
    - All the resources that are needed in order to be able to organize the event are provided in the Microsoft Excel documents, therefore removing the uncertainty from the planning process.

ACT

The objective is to implement the use of the created software in Fall of 2014. This will be the first implementation of the finalized system and will hopefully be a successful implementation. These files will be stored in The Society of Women Engineer's PolyLearn website. This website is controlled by the faculty advisor and can be made available to

each new officer every year. These files will also be stored in the event's Google Drive, which is transferred to each new officer every year.

ANALYSIS RESULTS

The following section is the analysis of the results mentioned previously in the document. It is a summary of previous demographic data and the study that was completed during the prototype implementation.

DEMOGRAPHIC INFORMATION

High School Shadow only collected Demographic Data on the number of people in attendance of the event and how many of those were male or female. The same was done for Building an Engineer Day. The information is shown in Figure 35 below.

Event Name	Total Attendance	Women in Attendance
High School Shadow (Spring 2013)	49	49
Building an Engineer Day (Spring 2013)	81	37

Figure 35: Table of Demographic Data (Spring 2013)

TIME STUDY

Data was collected to analyze if there was a difference between the system check in method and the paper check in method. The collected times of the study were adjusted based upon if the operator's skill in checking a student in. The raw data can be seen in Appendix-Raw Data Table. The data was analyzed using the statistical program called "Minitab" The Anderson Darling test was performed in order to evaluate if the

collected data was normal. From Figure 36 it can be seen that the p-value is 0.642 therefore the assumption that the data is normal cannot be rejected.

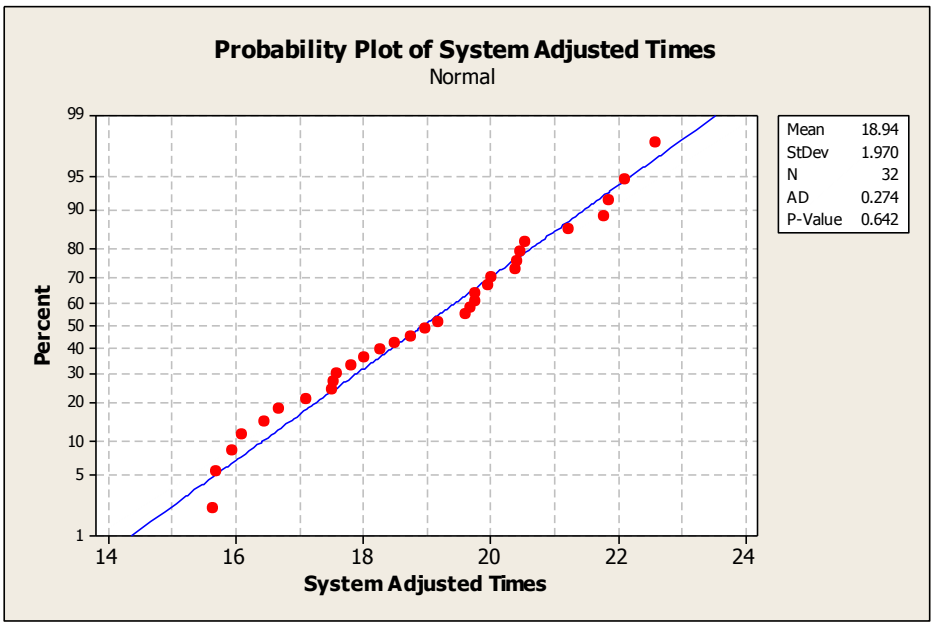


Figure 36: AD Test

In Figure 37 the distribution of the individual values can be seen plotted. On the left is the plotted times it took to check students in using the paper method. It can be see there is a larger range in data than the system times. This can be understood since the paper method the time to check a student in could vary dependent upon where the student's name falls on the paper list. The smaller range of the system check in times could indicate that the times don't vary depended upon the student's name as the paper check in time did.

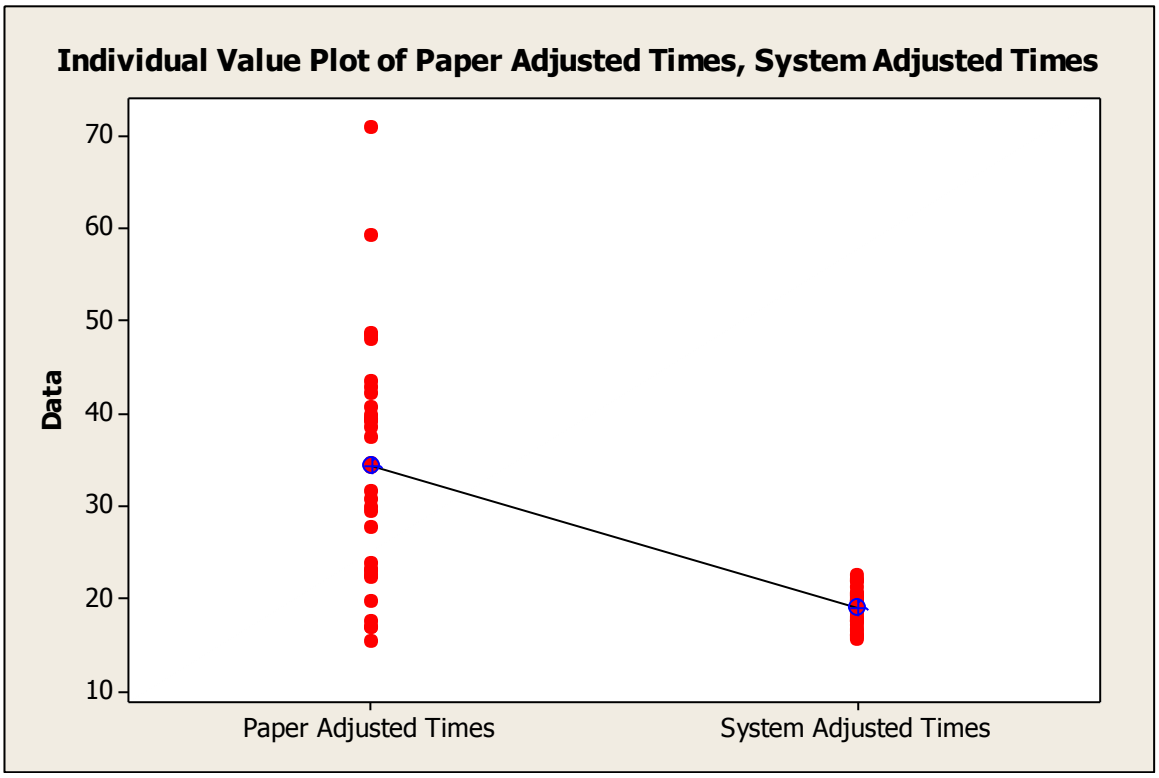


Figure 37: Individual Value Plot

When a two sample t-test was performed using a confidence interval of 95%. The null hypothesis that was tested was that the average of the paper check in took the same amount of time as the system check in. The data see in Figure 38, shows that the null hypothesis can be rejected with a p-value of 0.000. This indicates that the average time for the paper check in system was not the same as the system check in system. From the 95% confidence interval for the difference it can be assumed that the paper check in method took longer than the system check in method. ,

```
Two-sample T for Paper Adjusted Times vs System Adjusted Times

                          N   Mean  StDev  SE Mean
Paper Adjusted Times     32   34.2   12.9      2.3
System Adjusted Times    32  18.94   1.97     0.35


Difference = mu (Paper Adjusted Times) - mu (System Adjusted Times)
Estimate for difference:  15.30
95% CI for difference:  (10.62, 19.99)
T-Test of difference = 0 (vs not =): T-Value = 6.65  P-Value = 0.000  DF = 32
```

Figure 38: Two-Sample T-Test

CONCLUSIONS

With the completion of this senior project there is now a timeline and guidelines that will aid in the planning of both Building an Engineer Day and High School Shadow. These events now have an outline on how they should be run and what process should be followed. If the officers choose to implement the created software the event will run smoothly.

The Society of Women Engineers focuses on encouraging students to choose engineering as their profession and their outreach events are a main way they spread that message. Building an Engineer Day and High School Shadow are the largest outreach events for the Cal Poly SWE section, and now with the developed software this senior project has created the event has the potential to reach more students.

Through this project High School Shadow and Building an Engineer Day events are now organized and structured; it should now result in good officer retention, decrease in expediting costs, and increase the attendee turn out.

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APPENDIX

Raw Data Table

Process	Time (sec)	Rating	System Adjusted Times	Order Number
System Check In System	16.45	1	16.45	1
Paper Check In System	15.4	1.1	16.94	2
System Check In System	19.7	1	19.7	3
System Check In System	19.6	1	19.6	4
System Check In System	19.78	1	19.78	5
System Check In System	22.58	1	22.58	6
System Check In System	20.4	1	20.4	7
Paper Check In System	43.5	1	43.5	8
Paper Check In System	34.2	1	34.2	9
Paper Check In System	23.1	1	23.1	10
System Check In System	15.71	1	15.71	11
Paper Check In System	59.2	1	59.2	12
Paper Check In System	39	1	39	13
System Check In System	17.6	1	17.6	14
System Check In System	16.11	1	16.11	15
Paper Check In System	13.9	1.1	15.29	16
System Check In System	19.98	1	19.98	17
System Check In System	18.98	1	18.98	18
System Check In System	18.27	1	18.27	19
System Check In System	17.55	1	17.55	20
System Check In System	15.95	1	15.95	21
System Check In System	22.11	1	22.11	22
Paper Check In System	20.5	1.1	22.55	23
System Check In System	21.24	1	21.24	24
Paper Check In System	16	1.1	17.6	25
System Check In System	21.77	1	21.77	26
System Check In System	17.52	1	17.52	27
System Check In System	20.47	1	20.47	28
Paper Check In System	29.9	1	29.9	29
Paper Check In System	15.3	1.1	16.83	30
Paper Check In System	36.9	1.1	40.59	31
Paper Check In System	20.9	1.1	22.99	32

System Check In System	15.66	1	15.66	33
Paper Check In System	34.9	1.1	38.39	34
Paper Check In System	48.5	1	48.5	35
Paper Check In System	42.7	1	42.7	36
Paper Check In System	31.4	1.1	34.54	37
Paper Check In System	27.7	1	27.7	38
Paper Check In System	41.6	0.9	37.44	39
Paper Check In System	20.2	1.1	22.22	40
System Check In System	18.5	1	18.5	41
Paper Check In System	31.5	1	31.5	42
System Check In System	17.12	1	17.12	43
System Check In System	16.68	1	16.68	44
Paper Check In System	21.6	1.1	23.76	45
Paper Check In System	42.1	1	42.1	46
System Check In System	20.55	1	20.55	47
Paper Check In System	44.23	0.9	39.807	48
System Check In System	19.17	1	19.17	49
System Check In System	17.82	1	17.82	50
System Check In System	21.86	1	21.86	51
System Check In System	19.77	1	19.77	52
System Check In System	18.01	1	18.01	53
Paper Check In System	17.9	1.1	19.69	54
System Check In System	20.41	1	20.41	55
Paper Check In System	48	1	48	56
System Check In System	20.01	1	20.01	57
Paper Check In System	43.6	0.9	39.24	58
Paper Check In System	26.7	1.1	29.37	59
Paper Check In System	70.7	1	70.7	60
System Check In System	18.77	1	18.77	61
Paper Check In System	30.7	1	30.7	62
Paper Check In System	48.4	1	48.4	63
Paper Check In System	39.4	1	39.4	64