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GNG1103

Engineering Design

Course Professor: Dr. Rubina Lakhani

Deliverable H

Prototype III and Customer Feedback

Presented to: Abhilasha
Prepared by Group # 11

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Introduction:

Throughout the past few months, GNG1103 students in section G have been collaborating with Ross Video. This collaboration has been initiated for the goal of designing panels on DashBoard for the operators at the TD Place to display fresh content to engage and excite the fans. Among the concepts that RossVideo has provided us, group 11 has focused on creating a panel design for displaying fan birthdays and the team set ups. Though we are not sure when exactly these panels will be in use, we ensured that the panels are efficient and configurable enough so that they can be used at any point of the game. Our main goal is to make the panels easily configurable for different birthdays and different teams, easy to set up and simple in design to limit "noise" (i.e. the presence of functions and buttons that make the panel difficult to understand or cluttered). All in all, we want to ensure a smooth workflow for the operator, such that he or she is comfortable in using our panel and that no confusion coming from the operator is installed.

In this deliverable, the prototype created in the last deliverable will be further tested, evaluated and improved based on the results of the testing. It will present a revised test plan and results of said tests in prototype 3. At this stage and according to the previous tests done in other prototypes, the panel is functional and ready for use in connection to XPression. Nevertheless, even though our panel is ready to use in XPression, we may not have the chance to fully utilize this platform. Thus, we are mainly focusing on maximizing and optimizing the effect of the User Interface as well as taking into account Jakob's 10 Heuristics.

To test the prototype, we will ask some of our family members and classmates to program the panel on their own so as to gain insight on how fast and how easy it is for the user to configure the panels. Lastly, this report will include feedback and comments collected from the users of the software which will in turn be utilized further to modify and optimize our panel design.

Our plan to finalize the design is to ensure full configurability of the panels on DashBoard. This will ensure that the measured functionality of the panel is optimal, such that it can finally be used by the operators during a hockey game. Lastly, though the team may not have the chance to test the Dashboard Software on the presentation engine XPression, we will ensure that the panel is fully configurable and accessible to the operator, through various iterative processes of testing and optimization of our panels.

In the next deliverable, our team will attend Design Day and present our product to the customer, Ross Video. We will ensure to construct a concise and an effective presentation for them to be able to get a sense of all the functionalities of our product within a short period of time.

Prototype Test Plan :

Test ID	***Test Objective (What)***	***Description of Prototype used and of Basic Test Method (Why)***	***Description of Results to be Recorded and how these results will be used (How)***	***Estimated Test duration and planned start date (When)***
1	Test the time over which the panels are configurable by a team member: - Under 40 seconds for team setup. - Under 1 minute for fan birthdays.	- The timing depends on the importance/difficulty of the task. -The client requested the panels to be fully configurable for the user (the operator). -Primary and secondary colours, logos of the teams and team names need to be easily changeable by the operator. - For fan birthdays; names, personalized messages and pictures of fans, the amount of birthdays and the time allocated for the birthdays need to be easily configurable by the operator. -Since the optimization of the panel layout and the configurability has been addressed in the previous prototypes, there should not be a problem of reaching this time constraint.	- After designing the panel, the results of the test will be recorded by acting as the operator and changing the information on the panels as if there was a game going on. - Thus, not only do we need to test if the Dashboard panel effectively accepts configurable data, but we also need to test how easy it is to configure the data, such that the operator does not need to search for the information he/she needs, but rather can find it directly at his/her fingertips. - The team will know if the results are effective if these two guidelines are answered. More precisely, to ensure that the search for information is done quickly and effectively, we will time ourselves as we go through the operator's task. - For example, when inputting the information of birthdays in the various boxes, we want it to take at most 10-15 seconds for each birthday. This task would take the most time because we know that there is a lot of information that needs to be inputted for each birthday box	- The speed of configuration of the panels will be assessed during the time period of November 11-25th

			(name, age, message and picture). -However, the smooth transition between each birthday (once all the information is inputted) should take the same time predicted at the beginning (for example, if the time allocated for the total birthdays is 15 seconds and we have 5 birthdays to show during the game, the time should be respected such that there is no lag and that the birthdays are transitioned smoothly between each one -> 3 seconds for each birthday, no more, no less.)	
2	Test the time with which a family member can program the panel: - Under 1.5 minutes for team setup. - under 3 minutes for fan birthdays.	- This metric will help the team assess how quickly someone can "pick up" so to speak on how to use our panel in the event that a new operator is brought onto the team very quickly. - This test will be conducted to measure "worse case scenarios"	- The amount of time (which will be physically timed) required to input information for a fan's birthday or a team setup will be taken into account and assessed for the quality and speed of work. - This will help us paint an image of how optimized the panel is.	Test will be done between November 18th and 25th
3	Assess the usefulness of having the tab to flip between fan birthdays and team setup at the top or the sides in order to	-In order to finalize the panel design and potentially better overall workflow, the tab being at the top of the panel may help an operator navigate more easily between tabs without having to look for things. -It is also important to	-The previous tests will be conducted with this new panel design and feedback on the new design will be gathered in order to ascertain how much better or worse the panel is with this modification.	Test will be done between November 18th and 25th

	increase ease of use	assess which font size would be better for the operator; will a font size too big clutter the panel? Or will a font size too small make it harder for the operator to find what he/she needs.		
4	Assess the usefulness and effectiveness of the timer with the end/pause/start parameter.	-The installation of a timer in the fan birthday panel will also ensure that the operator can follow what is happening on the main screen, such that if there is a problem/bug, the operator can easily pause the timer (which will in turn pause the transition of fan birthdays), and troubleshoot what is happening. -This is an important task to be tested because the operator installs a certain trust on the panel to work, if it does not work, with the added pressure and stress happening at that moment, the operator may not be able to effectively troubleshoot what is happening and therefore, this can consequently worsen the fan experience. -If the operator would have to manually clear	-We need to test how effective the pause and stop timer is. Will it lag such that once the operator presses the pause timer, will it pause the timer after a second? Or will it be instantaneous? -Thus, to ensure that our results have reached the effectiveness that we require, when the user presses the pause/end button, the results must portray an almost instantaneous stop of the timer (no lagging). -Same thing goes for the end parameter; is it effective at stopping entirely the animation such that all the boxes are cleared under 1-2 seconds?	Test will be done between November 18th and 25th

		every box after each task, it would be very time consuming. Thus, to ensure a balance between what the operator does and what the panel automatically does, we want to test how effective the stop animation button is to effectively reset the panel and the information contained within it.		
5	Assess the usefulness and effectiveness of the pop up fan birthday boxes.	-This testing is very important because without it the operator will not be able to proceed to the following tasks. -Indeed, we need to make sure that the operator will not accidentally input information on the wrong box and that someone's birthday is not shown on the main screen.	-We want to make sure that once we input a certain number of fan birthdays that will be shown on the main screen, that these boxes light up almost instantaneously so that the operator does not have to wait an awkward amount of time before starting to input the information in the boxes. -The light up boxes also need to be contrasting enough so that the operator knows exactly which boxes will be demonstrated on the big screen. -To ensure that we can proceed with what we have, we will survey our family and friends and ask them the following question: "If you were an operator of this panel and had to input information in some of these boxes, would you know which boxes you need to input information?" If 80% and over have said yes, we can proceed.	Test will be done between November 18th and 25th

6	Assess the usefulness of the clear button.	-We want to test how much time is saved once the operator presses the clear button, compared to having to manually clear each text box before proceeding to another task.	-To do so, we will have a control group and a test group: one panel where there is no clear button and another where there is. -Each team member will have to fill out the panel as if they were the operator, but one team member will have the clear button option, while the other must clear the textbox themselves. -These tasks will be timed such that we can differentiate how much time was required for each group. If the difference in time is 5 seconds or more, the clear button is beneficial and will be kept in the final design. If not, it will be removed.	Test will be done between November 18th and 25th
7	Assess the usefulness of the help button.	- We want to test to see if the help button effectively guides the operator, or if it is not pertinent in this case. -Does it cause clutterness in the panel or is it important to have these buttons?	-To ensure that we can proceed with what we have, we will survey our family and friends and ask them the following question: “If you were an operator of this panel, someone experienced enough to know how to use this panel, would you still want help buttons that guides you around? Also, does it increase the overall clutterness of the panel?” If 80% and over have said yes, we can proceed.	Test will be done between November 18th and 25th

Prototype III:

Test ID	***Test Objective (Why)***	***Was it successful?***	***Description of Results to be Recorded***	***Additional information***
1	Test the time over which the panels are configurable by a team member: - Under 40 seconds for team setup. - Under 1 minute for fan birthdays.	Yes -Both tests were completed under the time constraints. - Tests have been repeated twice by each team member.	-The panels are functionally configurable for the different numbers of fan birthdays, their information (names, messages and images) and for the insertion of different team logos, primary & secondary colours and team names in the allotted time -When operating onto the panel, it was clear the operator would find it easy to use, quickly configurable and concise. -All of our proof of concept ideas were implemented, the results are provided below.	-While configuring the teams' data automatically is a good idea, the fan birthdays will be configured manually in case of inappropriate messages or pictures. -The preview feature that allows the operator to preview the image and message one last time before displaying it to catch any errors works well and provides a new level of security in the graphics display.
2	Test the time with which a family member can program the panel - Under 1.5 minutes for team setup and - Under 3 minutes for fan birthdays.	Yes - Both tests were completed under the time constraints. - Tests have been repeated once by each family member/friend, a total of 10.	-It was found that even someone with no knowledge of DashBoard was able to program the necessary information for fan birthdays and team setup after having been given information about their objective.	N/A

3	Assess the usefulness of having the tab to flip between fan birthdays and team setup at the top or the sides in order to increase ease of use	Yes	-The implementation of the tab switch feature at the top of the Dashboard menu instead of at the sides greatly improved the speed with which the user was able to identify where they needed to go. - Indeed, when the user opens the panel, the first thing they lay their eyes on is the top of the page (like a title in a website page). Therefore, having the tabs at the top of the panel ensures that the user can easily figure where she/he needs to go without scrolling around finding the appropriate tabs required.	-Those surveyed and tested on the panel described the tab design to flip between tabs at the top of the panel much easier, saying "Given that it's where everyone looks first, it makes a lot more sense to be at the top for such a big control"
4	Assess the usefulness and effectiveness of the timer with the end/pause/start parameter.	Yes	- Tested twice by each team member, for each panel (a total of 8 trials for each panel). - Without taking into account the performance of each of the team member's computers, there has been no significant lag in these trials that would disadvantage the operator. - The pause, end and start button on the timer all functioned simultaneously.	-We assumed that the operator's computer has a high performance such that it does not come into account when processing our panel design (limiting experimental noise)
5	Assess the usefulness and effectiveness of the pop up fan birthday boxes.	Yes	-Once family members and friends were surveyed, we were able to reach a total of 83% of those surveyed who agreed that it would be clear enough for the operator to know where to input the information for the fan birthdays.	-One of the people surveyed suggested a fail-safe mechanism where if the operator inputs any information in the boxes that are not lit-up, the panel would not be able to be sent

			-They've added comments, such as "it has a nice contrast between the grey and black with the white borders", "I like how it's always the top boxes that are lit up, the lit-up boxes are not randomized, but rather organized for the operator."	out to Xpression since there would be a missing lit-up box that does not have any information. The team has taken this into consideration, but decided against it because it would overcomplicate the design of the panel.
6	Assess the usefulness of the clear button.	Yes	-2 team members were the control group (no clear button) while the other two were the experimental group (clear button installed). -The experiment was repeated twice (the control group and the experimental group were switched). -The first experiment resulted in a time difference of 4.7s while the second experiment resulted in a time difference of 5.3s. Thus, we can proceed with a clear button on both panels.	-We have not taken into consideration how the performance of a computer can affect the time of the tasks that had to be done (reduction of experimental noise)
7	Assess the usefulness of the help button.	Yes for fan birthdays No for team setup	-Once family members and friends were surveyed, we were able to reach a total of 86% of those surveyed who agreed that it would be helpful to have help buttons for the fan birthdays panel. Thus, the help button will stay on the fan birthday panel. -We reached a total of 76% of those surveyed who agreed that	-Those surveyed justified that since the fan birthday panel contains more information and is important for the fans who want their birthday displayed on the main screen, the operator should understand completely how to

			it would be useless to have help buttons for the team setup panel. Since it was a lot lower than 80%, we removed the help button on the team setup panel.	work that panel, so help buttons on the fan birthday panel is helpful. -Those surveyed justified that the team setup panel is much easier to comprehend, even for those who do not have a specific expertise on DashBoard. Therefore, since the team setup panel is already clear for the operator on its own, it would be redundant to include help buttons for that panel and it would only increase clutterness.

Analysis of Systems Included:

The prototype is divided into 2 different subsections:

- Fan Birthdays
- Team Setup

For Fan birthdays, critical components of the solution must include:

a) Programmability of the number of fan birthdays ✓
b) Ability to adjust the amount of time birthdays are displayed for ✓
c) Ability to spontaneously stop the program's running ✓
d) Ability to spontaneously pause the program's running, in order to display something else on the screen and resume where paused ✓
e) Automatic connection of a "Fan Birthday Box" to the desired displayed graphics in XPression (XPression Graphics are not finished/not needed)
f) Ability to adjust the fan's name, personalized message, and displayed picture (if any) in any birthday box displayed ✓

For Team setup, critical components of the solution must include:

a) Editability of the primary and secondarys colours, logos, and team name displayed in the XPression Graphic (XPression Graphics are not finished, but editability has been reached) ✓
b) Graphics cues must be easily accessible and the time delay between the graphics must be editable ✓
c) Editability of sound effects by the operator ✓
d) Ability to spontaneously stop the program running ✓
e) Ability to spontaneously start the program ✓
   - In DashBoard, we allocated 1GB of RAM for the panels, less than 9% of the 1GB was being used after our final optimization of the panel. Therefore, it is fair to assume that after the project is finished, 1GB of RAM will be more than enough to run the program.

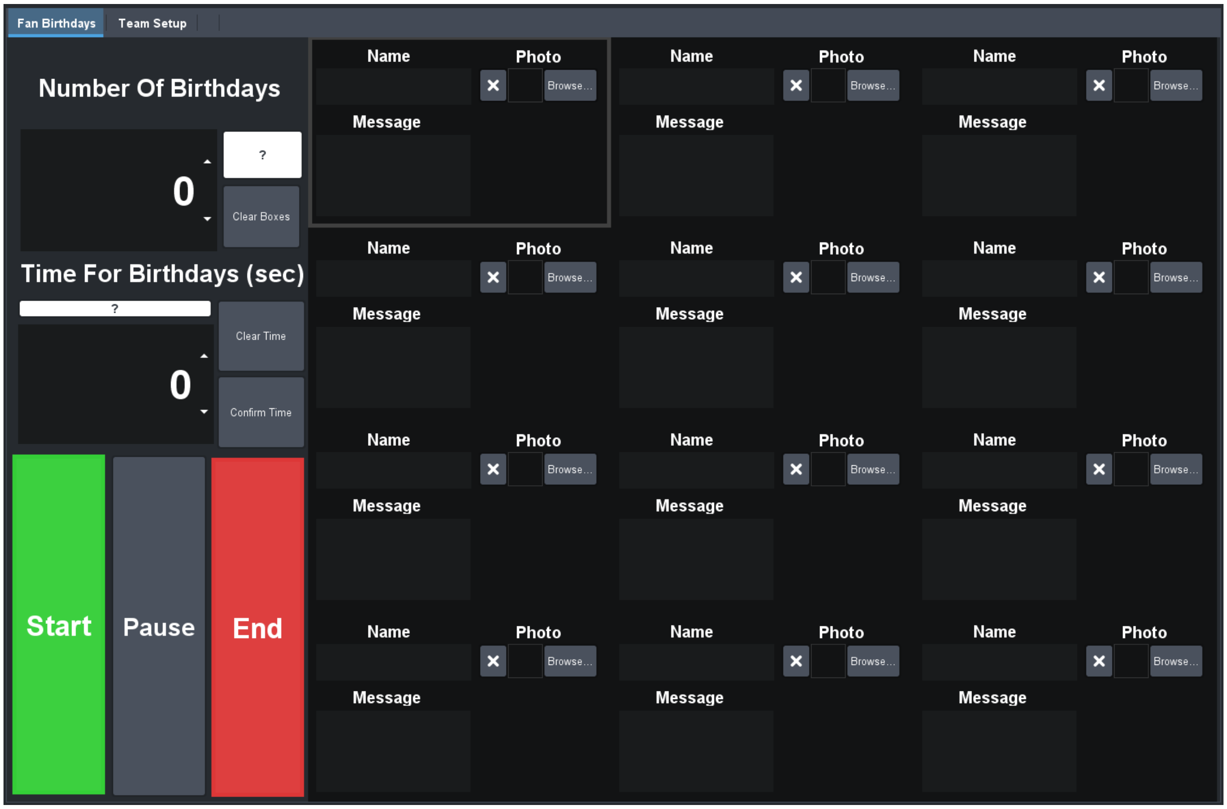
List of Materials:

For both prototypes I, II and III, only DashBoard is needed. Thus, the original list of materials and BOM has not been modified.

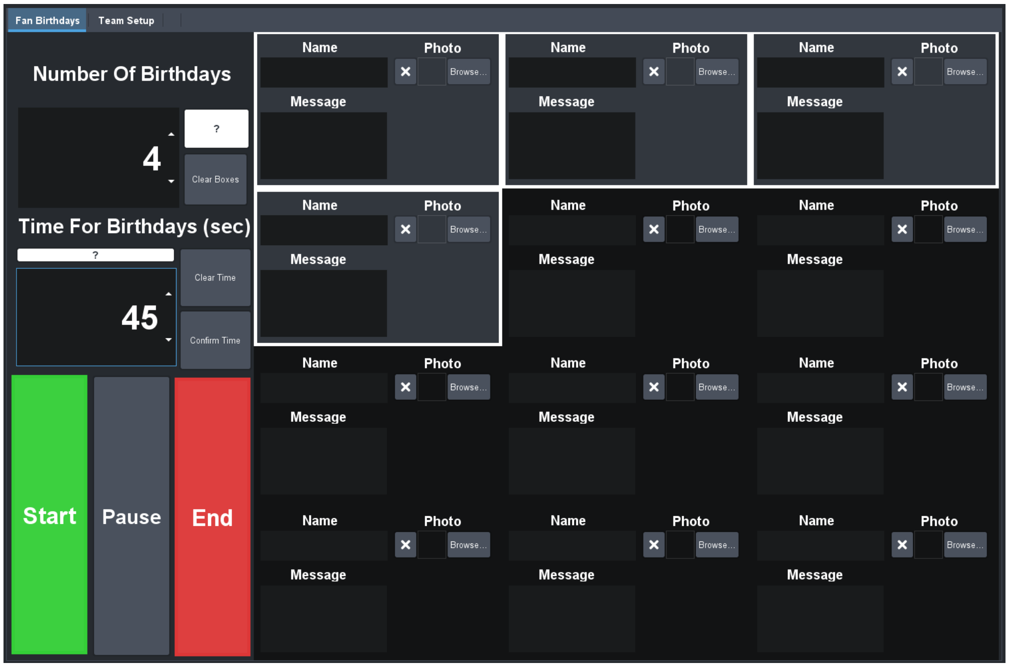
Prototype III:

Lay Out of the Panels (Operator's View)

Fan Birthdays Panel Layout



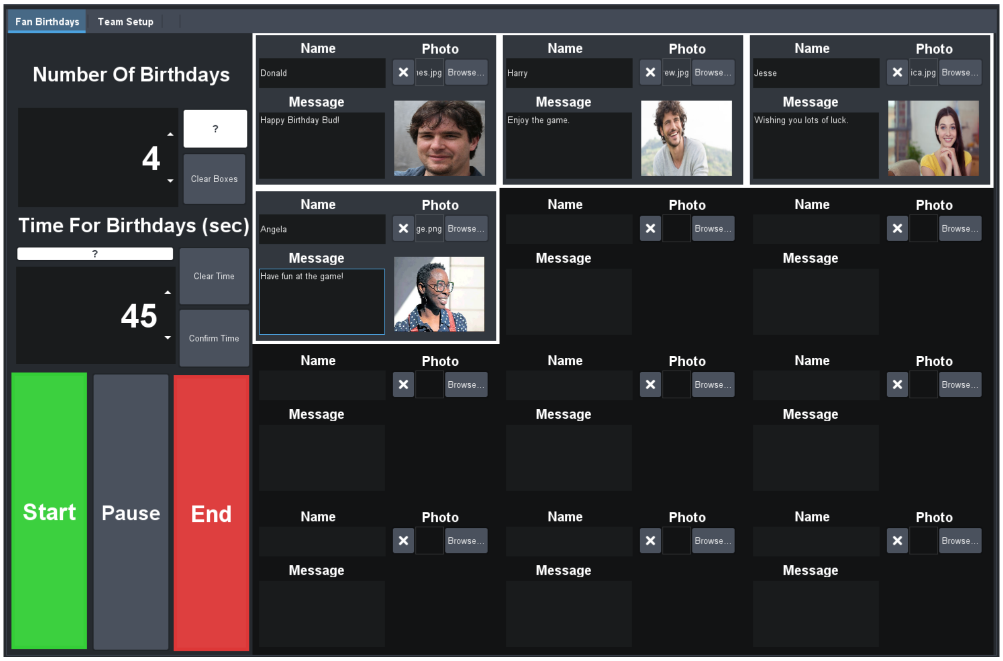
When the panels file is opened on DashBoard, this will be the operator's original view, there will be no boxes on the right side of the screen to input any fan birthdays yet.



Number Of Birthdays: 4

Time For Birthdays (sec): 45

4 boxes have been lit up when the operator has increased the amount of birthdays needed. While all of the boxes are editable, the ones that have been lit up will be considered.



Number Of Birthdays: 4

Time For Birthdays (sec): 45

Name: Donald
Photo: es.jpg
Message: Happy Birthday Bud!

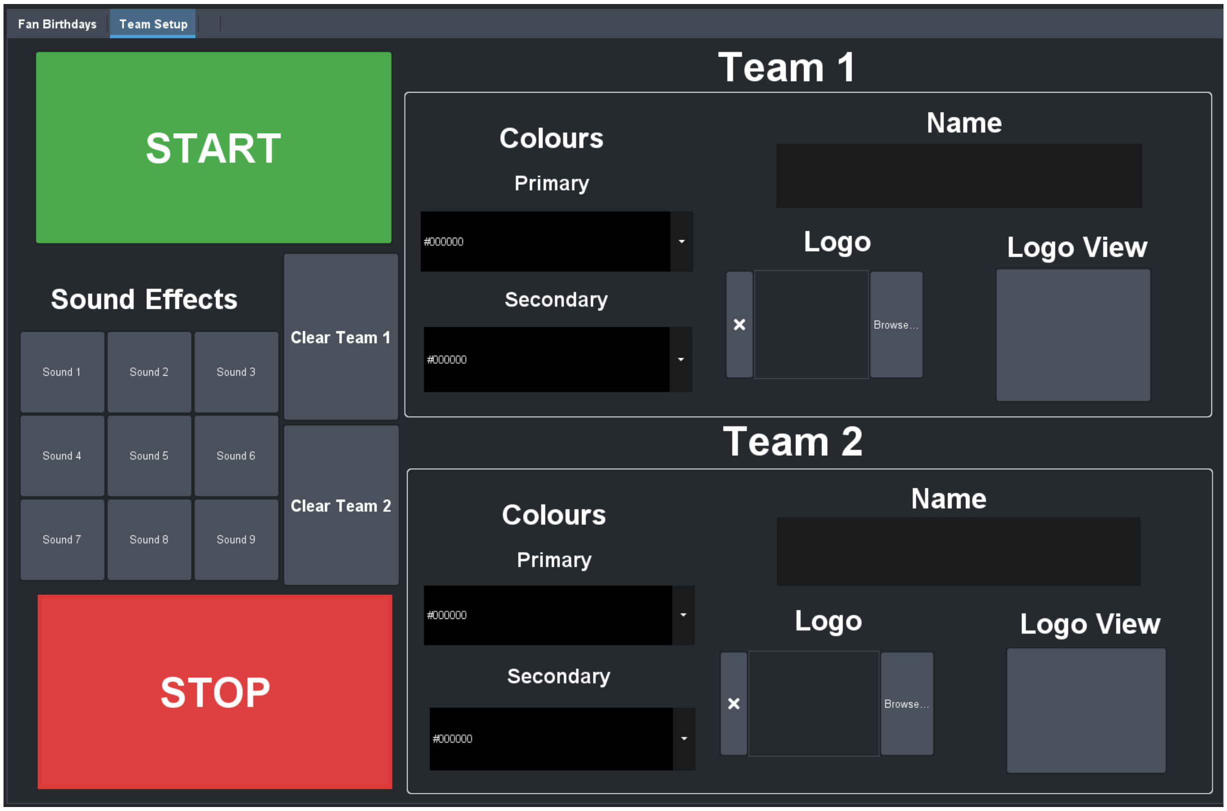
Name: Harry
Photo: ew.jpg
Message: Enjoy the game.

Name: Jesse
Photo: ica.jpg
Message: Wishing you lots of luck.

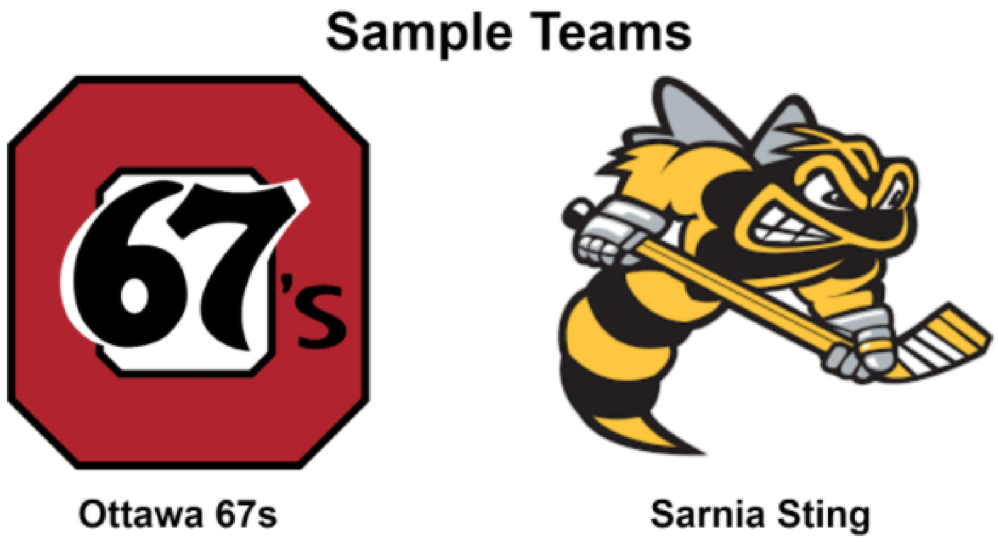
Name: Angela
Photo: ge.png
Message: Have fun at the game!

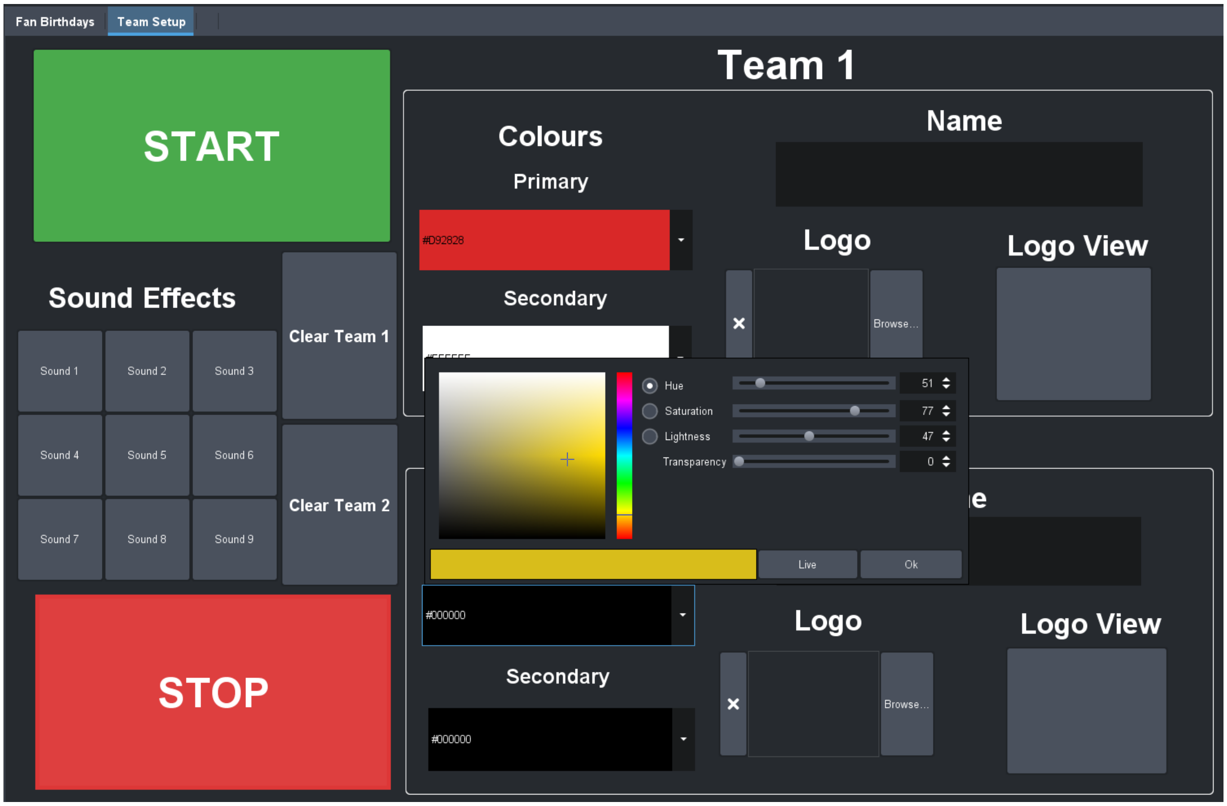
For a video demonstration on how to use the panel use the link: https://youtu.be/69VjieaSnJ8. This video is for an older prototype. It looks a little bit different, but all of the functions are the same.

Team Setup Panel Layout



When the Team Setup panel is opened, this will be the operator’s original view, there will be no team names, colours or logos yet.





Primary: #D92828

Hue: 51

Saturation: 77

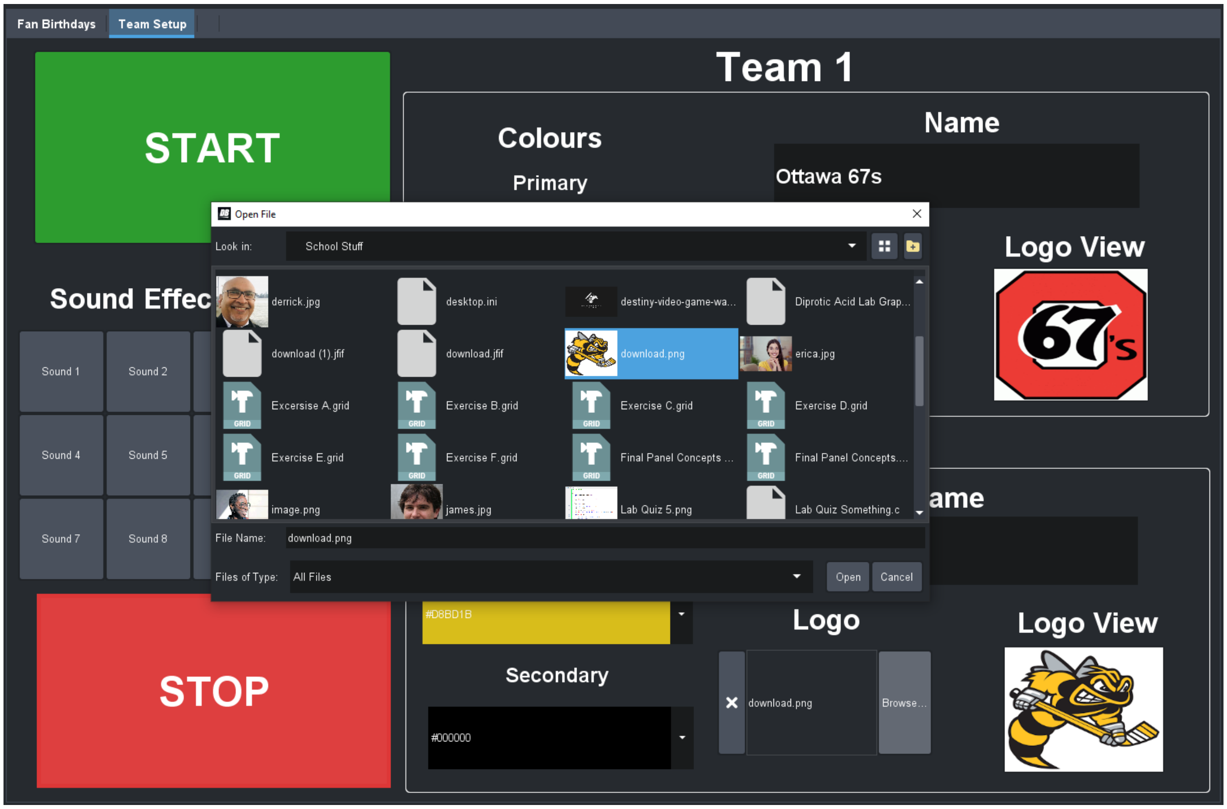
Lightness: 47

Transparency: 0

#000000

Secondary: #000000

The operator has inputted team names as well as the primary and secondary colours.



Name: Ottawa 67s

Look in: School Stuff

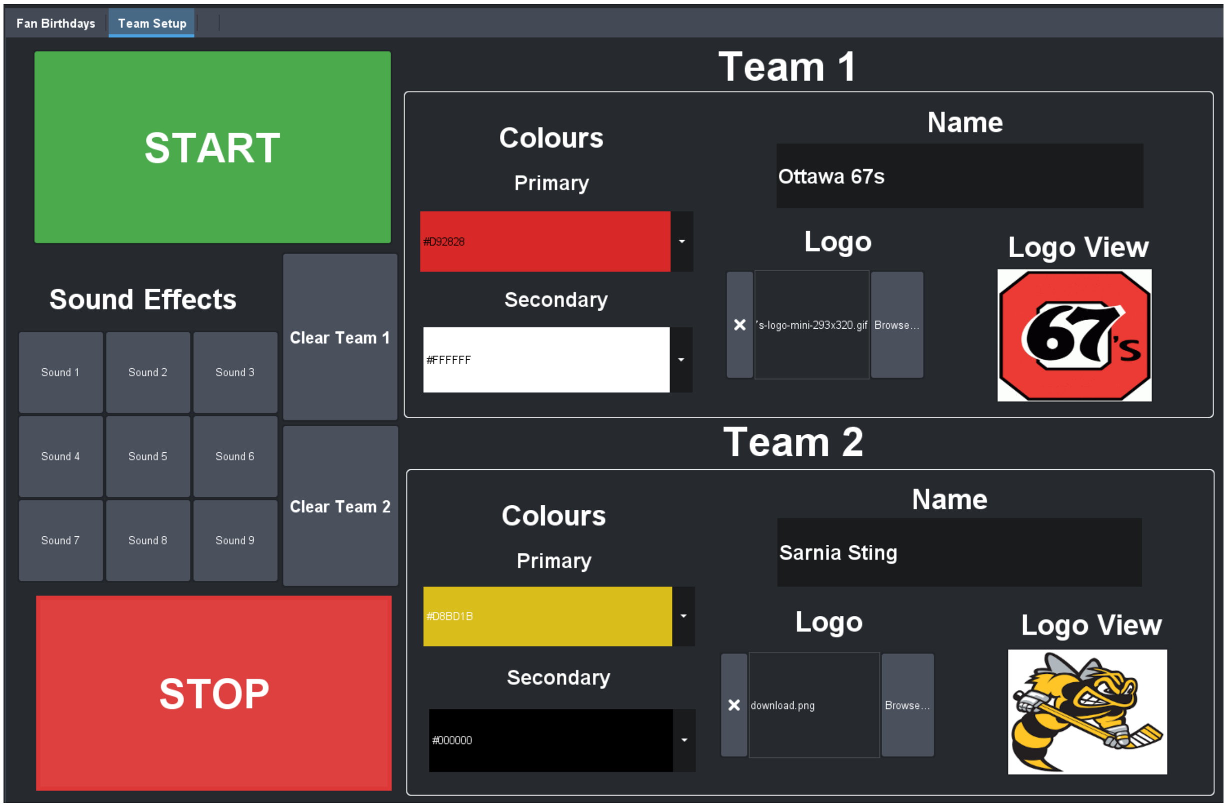
File Name: download.png

Files of Type: All Files

#D8BD1B

Secondary: #000000

Logo: download.png



Team 1

Name: Ottawa 67s

Primary: #D92828

Secondary: #FFFFFF

Logo: 's-logo-mini-293x320.gif

Team 2

Name: Sarnia Sting

Primary: #D8BD1B

Secondary: #000000

Logo: download.png

This is the final panel when having entered all of the necessary inputs. For a full video demonstrating the process, please use the link: https://youtu.be/-wesfRz96sY.
This video contains an older prototype which looks a little bit different, but still contains all of the same functions as the current one.

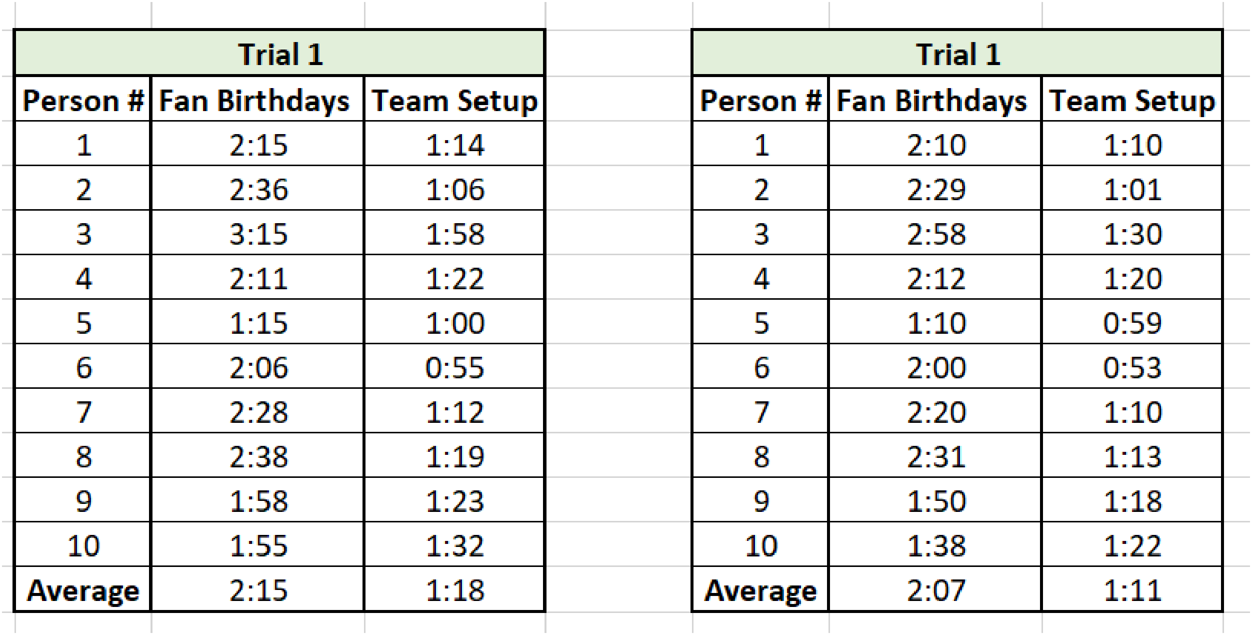
Documentation of Prototype Testing Plan, Analysis and Results:

Gathered Feedback On Prototype III:

1) For the 1st test for Prototype III (Test the time over which the panels are configurable by a team member) We found the panels to be fastly configurable:
   - Laura: 32 seconds to configure team setup & 43 seconds to configure fan birthdays.
   - Faraj: 37 seconds to configure team setup & 50 seconds to configure fan birthdays.
   - Jonathan: 28 seconds to configure team setup & 40 seconds to configure fan birthdays.
   - Eli: 34 seconds to configure team setup & 48 seconds to configure fan birthdays.'

Based on the results, the first test in the prototype test plan successfully passed.

2) For the 2nd test for Prototype III (Test the time with which a family member can program the panel) We found the panels to be fastly and easily configurable by people who had their first experience with DashBoard



Trial 1		
Person #	**Fan Birthdays**	**Team Setup**
1	2:15	1:14
2	2:36	1:06
3	3:15	1:58
4	2:11	1:22
5	1:15	1:00
6	2:06	0:55
7	2:28	1:12
8	2:38	1:19
9	1:58	1:23
10	1:55	1:32
Average	2:15	1:18

Trial 1		
Person #	**Fan Birthdays**	**Team Setup**
1	2:10	1:10
2	2:29	1:01
3	2:58	1:30
4	2:12	1:20
5	1:10	0:59
6	2:00	0:53
7	2:20	1:10
8	2:31	1:13
9	1:50	1:18
10	1:38	1:22
Average	2:07	1:11

Figure A: The Test Results of Family Members Configuring the Panels

- As seen in Figure A, during the first trial, only one person exceeded our allocated time of 1 minute and 30 seconds for team setup and the time for fan birthdays. However during the second trial they met the allocated time.
- The perfect differences between the average time for each of the trials is:
  - Fan Birthdays = 6.13834%
  - Team Setup = 9.42408%
  - Based on the results above, almost a 10% improvement was seen after only one trial, therefore we can conclude that the test was successful.

3) For the 3rd test for Prototype III (Assess the usefulness of having the tab to flip between fan birthdays and team setup at the top or the sides in order to increase ease of use): The implementation greatly improved the speed with which the user was able to identify where they needed to go.

- When a user utilizes softwares like excel, the control panel is always at the top. Therefore, having the tabs at the top of the panel ensures that the user can easily figure where she/he needs to go without scrolling around finding the appropriate tabs required.

- Jacob said, “Given that it’s where everyone looks first, it makes a lot more sense to be at the top for such a big control”

4) For the 4th test for Prototype III (Assess the usefulness and effectiveness of the pop up fan birthday boxes):

   - 83% of the people interviewed agreed to keep the help button on the fan birthday panels, they said that at first glance they thought the time was per birthday. Therefore if a new operator uses the panel they might get mixed up, for that reason we decided to keep the button.
   - 76% of the people interviewed agreed to remove the help button on the team setup panel, they described the panel as intuitive, easy to use and self explanatory. For that reason and to limit unnecessary clutterness, we removed the help button from the team setup panel.

Feedback and Results:

In this deliverable, we further tested our prototype by testing it ourselves once again and by getting family members to see how quickly they could program the panel. It was found that having the tab switch function at the top of the panel was far more conducive to workflow, and that the entire panel was configurable in under 5 minutes for even one that was inexperienced with the panel. This would indicate that the stopping criteria delineated in previous deliverable (i.e. the use of programming the DashBoard panel being optimized even for the most inexperienced) were met, and thus the prototype will be used as a final design on Design Day.

Conclusion:

In this deliverable, group 11 tested and finalized the functionality of the panels designed for Ross Video. The analysis results of the layout from prototype II were used to optimize the user experience and interface. Final testing revealed that the tabs being at the top improved workflow. The configurability of the fan birthdays and team setup tabs on Dashboard is now finalized, and the panel is finished based on the test results obtained throughout this deliverable.

For prototype III, the videos show an experimental analysis of how long it takes for someone unfamiliar with DashBoard to operate the panels. The analysis was successful based on the experiments conducted amongst friends and family.

In the upcoming weeks, we will make sure to practice our Design Day presentation as well as our class presentation. We will also continue to work on our user manual and provide detailed description of our product in order for the client to be able to implement our design smoothly and have no trouble with it.