Prototyping

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1. Prototype Description

We are using a flow diagram that shows each page of our application. It shows what buttons are on each page, what information is displayed on each page, and how users navigate between pages. Here we will describe the function of each page that will be in our diagram later in the document.

Page 1: Signup
This page will allow the user to sign up to our system. This page will have the following options:
- a. Name
- b. Username
- c. Phone number
- d. Email
- e. Password
- f. Type of user you are eg: Beginner, Intermediate, Expert if the user choose to log in as a student.

Page 2: Login
This page will allow the user to login to the system. This page will have the following options:
- a. Name
- b. Password

Page 3a: Home page for students
From here they can go to the profile tab of the specified user.
It will have two options:
- a. View profile
- b. Tutorials: This will direct to the page 5 where students will be able to see the tutorials that the particular student is assigned to.
  - i. Tutorials page will have list of songs that the student was assigned and that page will have play, pause, resume button
- c. Will also have settings page, they will have an option to choose their theme and level of difficulty.

Page 3b: Home page for teachers
From here they can go to the profile tab of the specified user.
It will have two options:

    d. View profile
    e. Tutorials: This will direct to the page 6 where teacher will be able to see the songs that the artists made.

    f. That page will have two options:
        i. Assign: Assign the songs to the students.
        ii. New: Make a new tutorials for students according to their level of difficulty.
    g. A settings page is available to allow users to change their profile theme. This would include changing visual elements such as color and style. They also will have the ability from this page to make other profile changes such as a public or private account.

Page 3c: Home page for artists
From here they can go to the profile tab of the specified user.
It will have two options:

    h. View profile
    i. Songs: This will have an option for the artist to make a song
        i. Song page will show the list of songs that the artist made.
        ii. The artist can add to the database
        iii. He can also record a new song by clicking on the "+" button, then the artist will have an option to record, play, pause.
    j. A settings page is available to allow this user to change their profile theme. This would include changing visual elements such as color and style. They also will have the ability from this page to make other profile changes such as a public or private account

Page 4: Profile
Depending on the type of user it will display the profile page through Home page.
Students: Results of the tutorials that they have completed.
Teacher: List of all students that they have assigned tutorials to and their results.
Artist: List of songs they have uploaded and how info about how popular they are.

Page 5: Tutorials for students
Here, students will see a list of the tutorials that have been assigned to them by a

teacher. The student can view what songs make up the tutorial. The student can select a tutorial or song to play, and this will direct them to the play instrument page (page 9) where they can play the selected song.

Page 6: Tutorials for teachers
Teachers can view all tutorials that they have created. Teachers can assign a tutorial to a student by selecting a tutorial than inputting the student's username. Teachers can create a new tutorial by pressing a button that will take them to page 8 to select songs. After songs are selected and the tutorial is created, it will be added to the list of tutorials on this page.

Page 7: Songs for artists
Artists can view all songs that they have created and uploaded to the song database. An artist can make a new song by pressing an add button, which will take them to the Play Instrument page (page 9). After the artist is done recording the song, they will confirm that they want to upload the song. If the song is uploaded, it will be added to the list of songs on this page.

Page 8: Songs for teachers
Teachers will be able to view a list of all songs that have been uploaded by artists. The teacher will select which songs they want to be in a tutorial, then press a 'done' button. When this button is pressed, all of the selected songs will be compiled into a tutorial and added to the list on page 6. This page will be closed when the done button page is pressed and page 6 will be re opened.

Page 9: Play Instrument
Students and artists will be able to use this page to play their AR instrument on this page. Students will have options to play, pause, and exit the tutorial that they have selected. When a student is done with a tutorial, they will be re directed back to page 5 to select a new tutorial. Artists will have options to start, pause, resume, and stop recording the new song that they are creating. When artists are done recording a song, they will be re directed back to page 7 to view their songs and create new songs. While playing the instrument on this page,users will see their prop with additional textures added to it using AR, as well as information about what notes to play and how well they are playing.

Page 10: Settings
All types of users will be able to access this page through a button on their home page (page 3). This page will have options for theme, color, and brightness, which will change how our application is displayed. Students will be able to change their difficulty level here so that teachers will know what difficulty level of songs to assign to them. Students and Artists will be able to change what instrument they want to play. Based on what instrument is selected, different textures will be displayed by our AR device to make the

prop look like that instrument. Instrument selected will also change what notes should be played and what songs are available.

2. **Prototype**

   a. Produce a prototype. (50 pts.)
   b. Describe two scenarios that your prototype includes. (This can be brief text; you don't need to use the scenario template). (5 pts.)
   Scenario 1:
   Artist records a song and uploads it:
   Steps:
      a. User logs into or creates an account that is of type artist.
      b. Artist is shown the Home page.
      c. Artist presses the "songs" button.
      d. Artist is shown the songs page which contains a list of songs they have uploaded.
      e. Artist presses the "add song" button.
      f. Artist is shown the Play Instrument page which has start, stop and finish recording buttons.
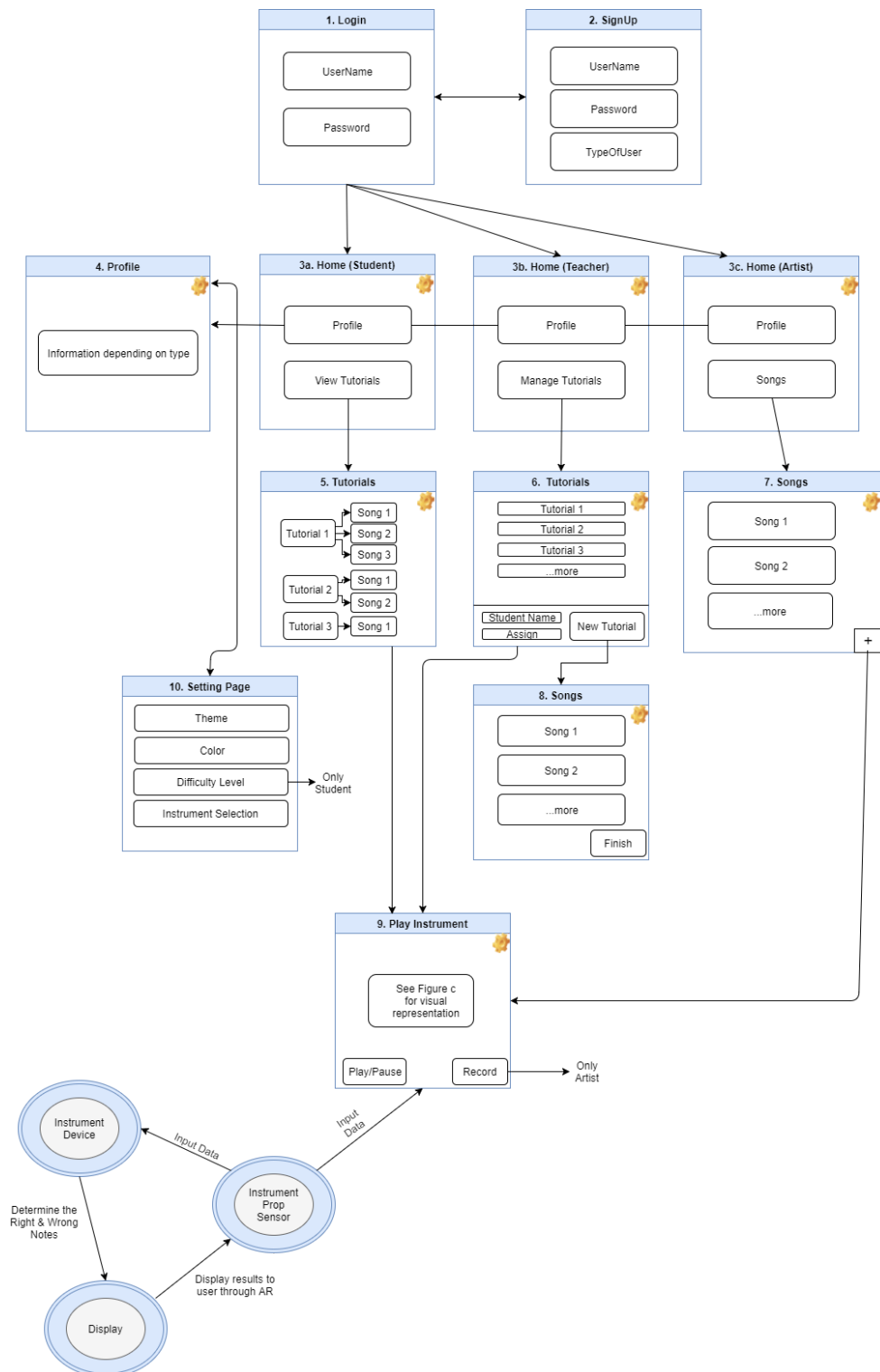   g. Artist finishes recording and confirms that the song should be uploaded.

   Scenario 2:
   Teacher selects songs and creates tutorial:
   Steps:
      a. User logs into or creates an account that is of type teacher.
      b. Teacher is shown the Home page.
      c. Teacher pressed the "Tutorials" button
      d. Teacher is shown the Tutorial page which has a list of songs that was made by the artists.
      e. Teacher now has an ability to assign or make a new tutorial for the students.
         i. Assign tutorial: presses "assign" button and enters a student's username
         ii. New tutorial: presses "new" button and is shown the songs page which contains a list of all songs. The teacher selects which songs will be in the tutorial, then presses a "confirm" button. The teacher is directed back to the Tutorial page with the new tutorial added to the list.

c. Your prototype must have at least one interactive loop where it receives input data and shows something changing in the AR as a result. Describe it briefly.

    i. Input data is received from the instrument prop sensors. This data tells our application what notes the user is currently playing. Our application determines if the notes that are being played are correct by comparing them to the notes of the selected song. The AR is changed to display if the note that was just played is correct or wrong (popups of green checkmark, red x, '20 note streak', and others). After the AR has displayed the result for the current note, our application waits for more input data from the instrument prop sensors and the cycle starts over again.

d. Your prototype must show some interaction of the user with the AR settings. Describe it briefly.

    i. The user can select which instrument they want to play by going to the settings page. Depending on what instrument is selected, the AR will display an overlay on the prop to make it look like the selected instrument. Our prop will be a basic shape that is similar to the shape (size and key placement) of the selected instrument, but detailed textures and additional information will be displayed through AR.

    ii. The user can select theme, brightness and color by going to the settings page. These will change how all of the application pages are displayed as well as how the AR information is displayed.

1. Login
- UserName
- Password

2. SignUp
- UserName
- Password
- TypeOfUser

4. Profile
- Information depending on type

3a. Home (Student)
- Profile
- View Tutorials

3b. Home (Teacher)
- Profile
- Manage Tutorials

3c. Home (Artist)
- Profile
- Songs

5. Tutorials
- Tutorial 1
  - Song 1
  - Song 2
  - Song 3
- Tutorial 2
  - Song 1
  - Song 2
- Tutorial 3
  - Song 1

6. Tutorials
- Tutorial 1
- Tutorial 2
- Tutorial 3
- ...more
- Student Name
- Assign
- New Tutorial

7. Songs
- Song 1
- Song 2
- ...more
- +

10. Setting Page
- Theme
- Color
- Difficulty Level → Only Student
- Instrument Selection

8. Songs
- Song 1
- Song 2
- ...more
- Finish

9. Play Instrument
- See Figure c for visual representation
- Play/Pause
- Record → Only Artist

Instrument Device

Instrument Prop Sensor

Display

Input Data

Input Data

Determine the Right & Wrong Notes

Display results to user through AR

Flow Chart Diagram

Prototyping Interfaces

- This interface is what our users will be viewing when they have song loaded and are ready to begin the tutorial.
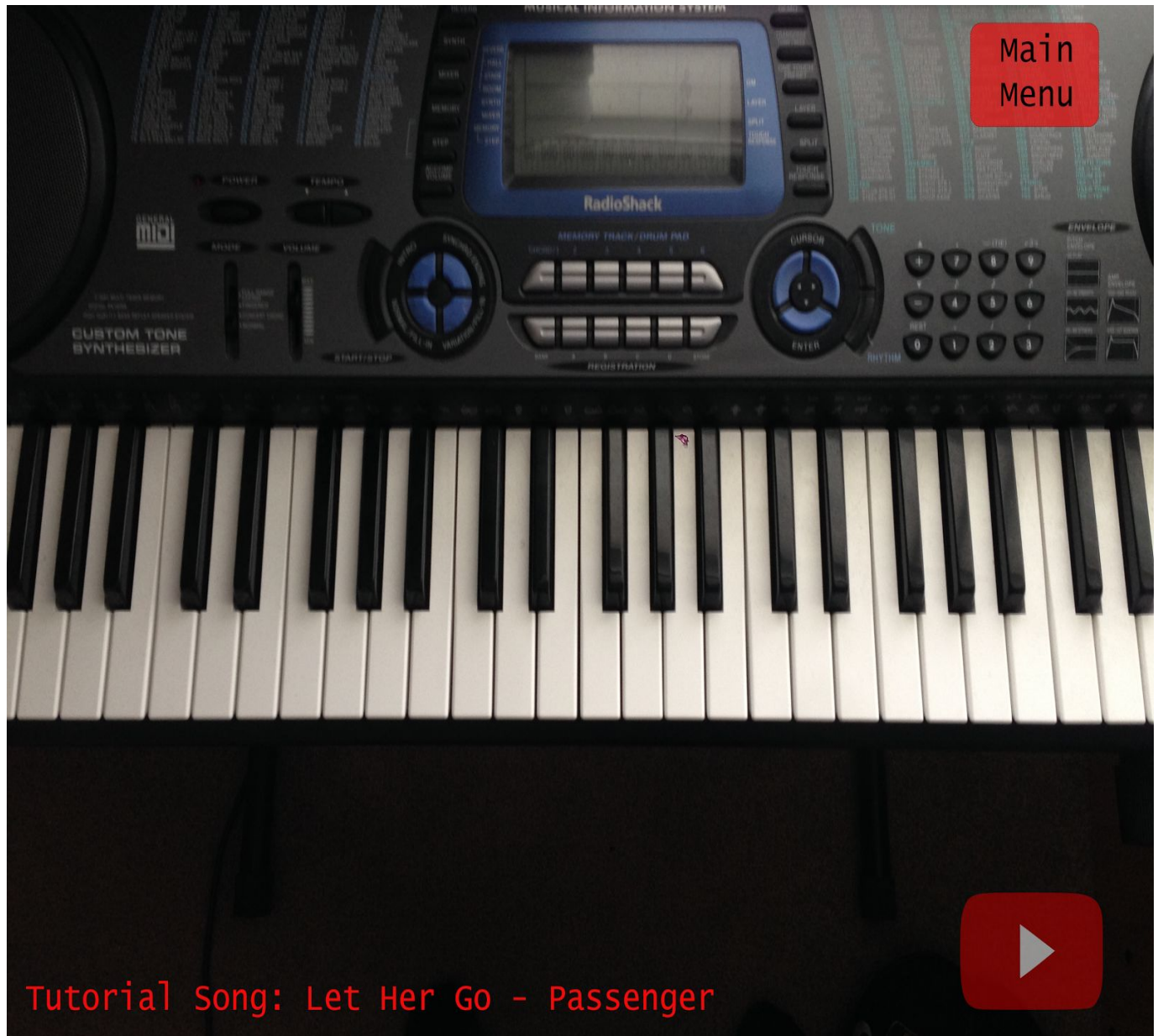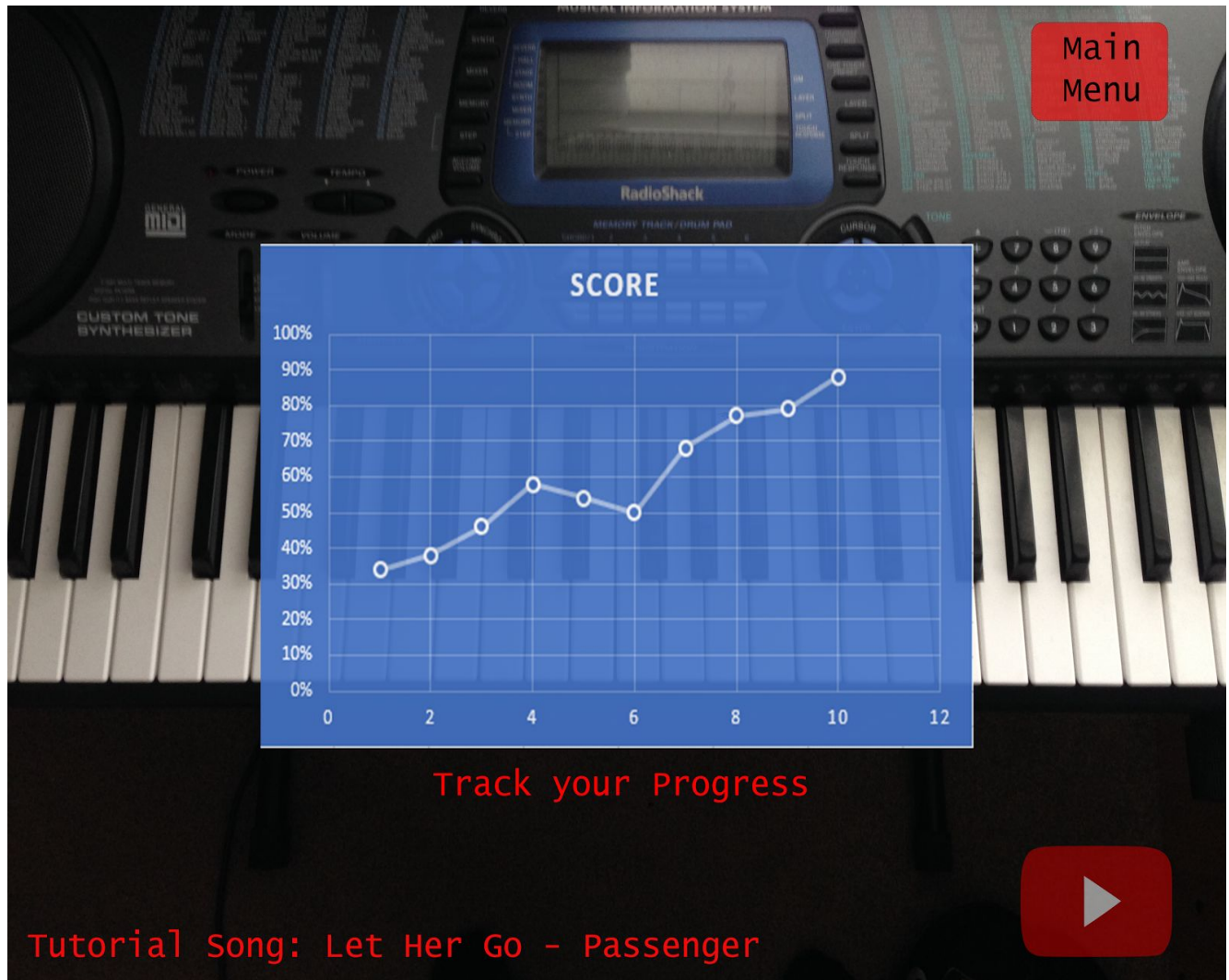

(Figure a)

- Below is an interface view of what the user will be viewing while playing the song tutorial when wearing the AR device.

(Figure b)

- This interface is what allows our users to begin to learn tutorial songs by using colored notes for the left and right hand. These notes augment the physical reality allowing our users to learn muscle memory and the correct finger placement to hit the proper notes.

- This interface is viewed at the end of a tutorial. This interface will allow our users to view their statistic from the current tutorial they just attempted, dating back to when they first began to start learning the specified tutorial song. This progression chart shows the user's progress from the last 10 sessions or the last 10 tutorials that they have completed for this specific tutorial song.

(Figure c)

- Pressing the play button in the bottom right corner will allow the users to replay the tutorial song for a better score percentage or they can simply navigate to view the main menu.

- This interface is what our users will be viewing through the augmented reality device when they click the menu option in the top right corner (seen in our previous interfaces). This quick menu guide will allow for our users to easily navigate through our application.

(Figure d)

3. **Testing the prototype.**

   Zach's Feedback Interview:
   Interviewer: Zach Dwyer
   Interviewed: Anthony Secord

   a. *How easy was it to navigate?*
      Answer: I felt that your User Interfaces were fairly easy to navigate, with a simple layout that is easy for anyone to jump right in and navigate.
   b. *Appropriate amount of features?*
      Answer: I felt that there were a good amount of features that would be able to assist me in learning a new instrument. I really enjoyed the fact that you could track you progress via the interactive chart right after you complete a tutorial song.
   c. *Is the tutorial feedback of how well you did learning, good enough?*
      Answer: Yes, I believe the feedback will help me to better understand myprogress. I liked how the interactive graph took into account the percentage of notes that I hit successfully.
   d. *Was the tutorial interface helpful and easy to understand?*
      Answer: Yes, I felt the tutorial interface was easy to understand and interpret. It reminded me a lot like the guitar hero interface. This will help a lot with my muscle memory when learning a new instrument.
   e. *What changes to your requirements will you consider as a result of the feedback you received?*
      Answer: After interviewing Anthony he thought that we have a very good application overall. The only concern he has is that he would like it to have a bit more of a competitive nature to our application. He thought it would be cool if we implemented a feature that placed student users into "classes" with other students. This would allow you to track your progress against your classmates who will have the same skillset as you. The teacher would be the moderator of this class assigning what tutorial songs the class should attempt.

Sam's Feedback Interview:
Interviewer: Sam Kline
Interviewed: Christopher Williams

a. *How easy was it to navigate?*
   Answer: Yes, there aren't too many screens where it is confusing to navigate. The transfers between the pages make sense to me.
b. *Appropriate amount of features?*
   Answer: Yes, there seem to be enough features to accomplish the core functionality. You could be more clear about the contents of the profile page in the prototype. You should also consider allowing users to access their profiles through a website or app so that they don't have to start up the AR device every time that want to access that information.
c. *What would you pay for this product and features?*
   Answer: The price for the prop and software would have to be noticeably less than purchasing a real instrument. Maybe $50-$100 for one prop and the software, additional types of props would cost more.
d. *What is the likelyhood of you recommending our product to a friend/family member?*
   Answer: If all of the described features are successfully implemented, I would recommend it. It seems like a good way to save money for people who want to play an instrument.
e. *What changes to your requirements will you consider as a result of the feedback you received?*
   Answer: A requirement should be added that the prop and software should be cheaper than purchasing a real instrument, since that is one of our main selling points of the product. We should also add requirements about ease of access to user information, and perhaps developing an app or website in addition to our current plan would be the solution to those requirements.

Jay's Feedback Interview:
Interviewer: Jay Patel
Interviewed: Atakilti Berhe

a. *How easy was it to navigate?*
   ***Answer:* It was very easy to navigate with a simplistic view when you have the AR device on your head.**
b. *Appropriate amount of features?*
   Answer: Yes, I feel there were an appropriate amount of features that will help me further my piano skill set.
c. *Is the tutorial feedback of how well you did learning, good enough?*
   Answer:*There was a decent amount of good feedback and the graph is essential in tracking my progress of each individual session.*
d. *Was the tutorial interface helpful and easy to understand?*
   Answer: Yes, it had a very simplistic view and easy to understand what notes I will need to properly complete.
e. What changes to your requirements will you consider as a result of the feedback you received?
   Answer: After the interview I asked Atakilti if I could answer any questions that he may have for me and I was asked the cost of the device. I gave him a price and I was then told that the cost is much higher and a college kid cannot afford that device. So I told him that he could either pay weekly/monthly and also explained all the unique features of the device. So one thing that we would consider as a result is maybe have more options for the college kids to make it a bit more cheaper and give a student discount and maybe make the cost cheaper in general as well.

Changhee's Feedback Interview:
Interviewer: Changhee Son
Interviewed: Dongkyun Kim

a. *How easy was it to navigate?*
   Answer: Yes. It does not force the user to choose many options. It's easy to see because there were pages that are obvious enough for me to see.
b. *Appropriate amount of features?*
   Answer:Yes. I think this has enough features as the first version. In the future, I think you could add a little more variety of modes for student users.
c. *Is the tutorial feedback of how well you did learning, good enough?*
   Answer: *I think it is appropriate. Later, you can create a function that allows you to select only the information you want and display it in a graph.**
d. *Was the tutorial interface helpful and easy to understand?*
   Answer: Yes, I felt the tutorial interface was easy to understand. I think the most important part of the interface is that it should be easy for people to use and understand how to use.
e. *What changes to your requirements will you consider as a result of the feedback you received?*
   Answer: After this interview, what I consider is adding a new mode for the user and keeping the current simple interface. The new mode is supposed to be a person versus a person. I thought it would be boring if student user could practice a lot of time alone, so I wanted to add the mode that student users can practice with others and compare the their results.

4. In-class exercises