

ENIAC

INTERACTIVE APP FOR COMPUTER HISTORY MUSEUM

Xin Pan | EDC 385G | May 3, 2018

PHASE I Project Plan

Project Title:

ENIAC – Exploration of Computer History Museum

Project Abstract and Background:

In the digital age, technology enables people to solve issues in different areas and it is time to think about what we should teach our students. Instead of asking people to think like computers and focus on the artifacts, the lesson should highlight how innovative ideas from humans can tackle real-life problems (Wing, 2006). Young people are expected to learn to write, learn to think, and learn to form computational structures and think digitally. This is not only for the purposes of jobs but also to be intellectual independence and become innovative creators (Ventimiglia & Pullman, 2016).

ENIAC intends to work as an interactive app for Computer History Museum located in Mountain View, CA. The app would help bring computer history to life through detailed information, including the root of today's internet and mobile devices and some of the very first computers from the 1940s to 1950s. It will include information on museum exhibitions and events and highlight featured artifacts and engaging stories in computer history through interactive activities. It also would provide users a closer look into an international collection of computing artifacts in the world, including computer hardware, software, documentation, photographs, etc.



Target Audience:

The target audience of ENIAC includes museum visitors who are planning to go to the museum and those who are interested in computer history. The primarily targeted groups of this app include college students and adults, but it may also include students from K-12 schools who are either on field trips or self-guided visits.

Project Goals:

- To support and enhance users' experience to Computer History Museum
- To present a vivid and interactive perspective on information, featured artifacts, and engaging stories of the Information
- To help bring computer history to life and enhance digital literacy for those who are preparing themselves for the future of technologies
- To inspire learners' imagination on possibilities in the new era and gain a deeper understanding of collaboration and innovation

Content for the Project:

Main contents of this project include:

- Museum exhibitions, including *Revolution*, *Make Software: Change the World, Where to? A History of Autonomous Vehicles*, and Demo Labs
- Highlighted events which will be held by the museum, such as guest speaks and workshops
- Activities including audio tours, quizzes, and augmented reality.
- Ticket information and membership information

Most information on these contents would be available online (<http://www.computerhistory.org/>), including texts, images, and some videos. Besides, there would also include interactive activities such as quizzes and augmented reality for visitors. These activities will be created by the developer based on the provided information and goals. Time will be mainly spent on designing icons, symbols, and interactive activities for the app.

Other Mobile Apps on Museum Trips:

There are several interactive mobile apps for various museums available on Apple Store:

- The MET – App for The Metropolitan Museum of Art
- Explorer- App for American Museum of Natural History
- National Gallery of Art HD

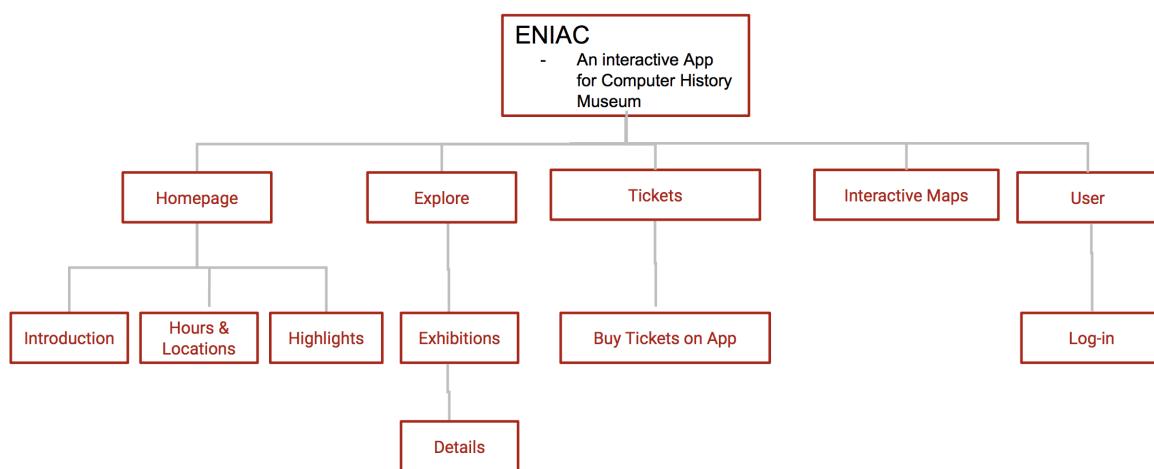
- Google Arts and Culture: providing information on nearby museums and artistic works
- Civilisations AR: interacting with historical and well-known pieces in British Museum through Augmented Reality

Missions of ENIAC

Since ENIAC intends to provide a comprehensive and efficient way for visitors to the museum, it would benefit its audience through multiple types of activities. Visitors, either with background from computer history or not, will be able to grasp basic ideas behind the greatest pieces created from human intelligence and their collaborative work. The most important lesson that they will learn not only include knowledge of computer and technology, but also how powerful human being can be and how fantastic imagination can be. In this way, CHM will better serve those in interest and inspire those who will become a member of information era and willing to make contributions.

PHASE II Project Plan

Overall Structure:



User Scenario & Persona:

Persona One: David



Bio Information: David is a 19-year-old sophomore from San Jose State University. He uses mobile apps frequently and is willing to learn new things about technologies. As an undergraduate majoring in math, he is particularly interested in computer and programming and has the plan to apply for a graduate program in computer engineering after graduation.

Scenario: David is attracted to the early history of computing as well as milestones and objects throughout the history. David got a series of questions on computing, such as how people calculated stuff without computers and how the very first computer work. However, the university does not offer a course on computer history and he hoped to get a more hands-on experience. A professor suggested him to go to the Computer History Museum located in the bay area. By browsing online, he did find some information on the museum, but he was looking for a mobile version with detailed descriptions on the exhibitions during his visit. He also would like to interact with the exhibitions and artifacts rather than just reading the information. Therefore, he wanted an interactive app on the museum so that he can plan ahead and get a more fantastic experience.

Persona Two: Lucia



Bio Information: Lucia is a human resources administrator in PayPal located in the Bay Area and she has worked in human resources for more than 10 years. She has never learned anything about programming but has worked with lots of engineers in her work. She has an 8-year-old son who likes playing coding robots and computer games.

Scenario: Lucia found his son was engaged in the coding robot and was able to work independently on the toy. In order to cultivate his interests, she planned to take him to more hands-on workshops and see how programmers and scientists work during the weekend. She heard about the Computer History Museum and decided to go. Before going there, Lucia wanted to check on latest events available during the weekend and bought tickets forehead. She also would like to know a little bit on computer history and featured exhibitions before going there so she can give some instructions to her son. Therefore, she is looking for a handy tool that she can have access to on the mobile phone.

Timeline & Milestones:

Dates	Milestone
3/14 – 3/21	<ul style="list-style-type: none">• Visit the museum to find out user needs and focuses• Wireframe & Storyboard• Decide color schemes and fonts• Design interactive activities for exhibitions page

- Work on the homepage on Sketch
- 3/21 – 4/4
- Work on prototypes of exhibitions and interactive maps
 - Finalize home page
- 4/4-4/18
- Work on ticket page and user page
 - Make interaction on InVision for all pages finished
- 4/18-4/25
- Test the prototype
 - Getting feedback and revise prototype
- 4/25-5/2
- Finalize the project
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PHASE III Designing & Producing

Updated Project Plan

ENIAC intended to facilitate and engage its target audiences who are visiting or planning to visit the Computer History Museum through the audio tour and interactive activities. In terms of its scope, the app covers information on four major exhibitions in the Computer History Museum, including *Revolution: The First 2000 Years of Computing*, *Making Software: Change the World!*, *Where to? A History of Autonomous Vehicles*, and the Demo Lab. Besides the general overview of the exhibition and its featured artifacts, ENIAC provides interactions through the audio tour and interactive activities.

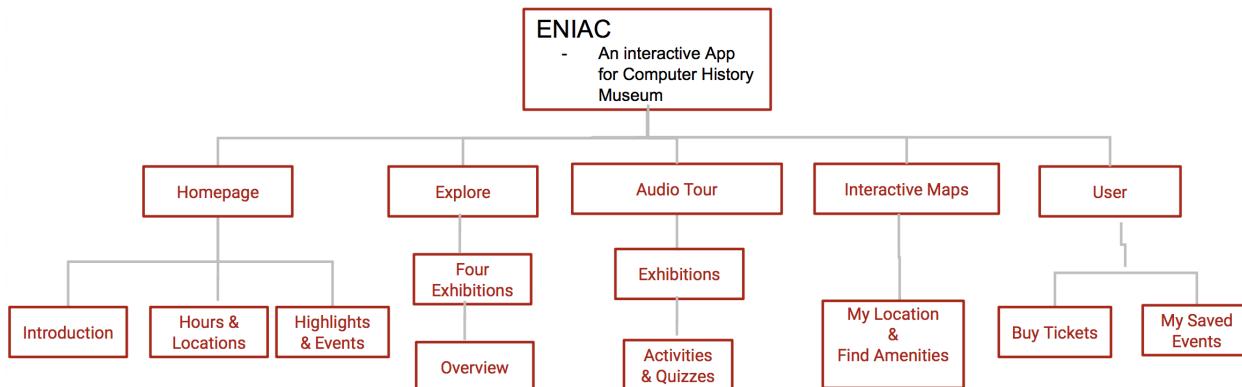
Audio tour provides an overview of the specific exhibitions and a list of its most featured artifacts. It also includes details for each artifact, such as audio or video instructions, quizzes, and interactive activities. Users will be able to obtain badges on the specific artifact after they finish the task. Other than information on the exhibitions, ENIAC facilitated visitors by offering a series of features, including buying tickets online, liking and sharing exhibitions, and adding events to calendars. In addition, they will also be able to locate themselves through the map, so they won't get lost or take a detour when visiting the museum. The map feature also helps visitors by showing them the location of food and drinks, gift shops, and restrooms.

Updated Overall Structure:

The organization structure defines the types of relationship between content items and groups. In order to reduce redundant information and stress logics of the structure, ENIAC presents an organization which is “shallow but wide”. In this way, users will be able to navigate to pages within a few tabs.

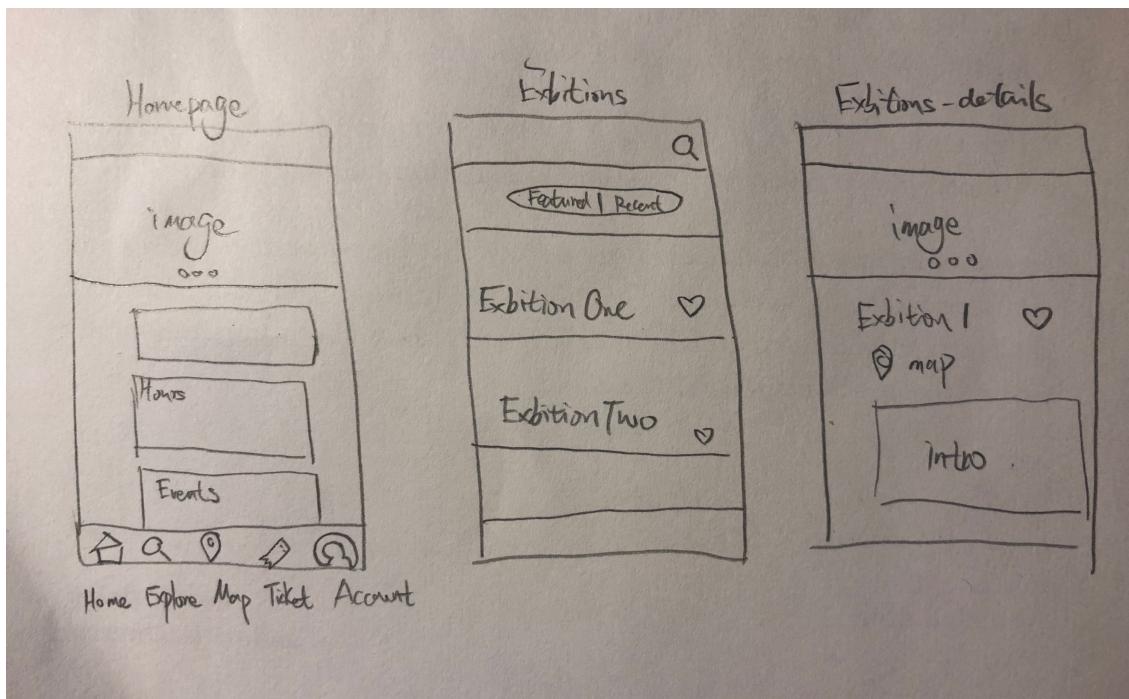
The app will include several screens to organize different information on the app. Main screens include:

- *Home Screen*: It should include the most important information for the museum, including opening hours, events, highlighted artifacts, and locations. In addition, it would be fascinating if the app can provide a short paragraph in order to deliver its purpose to the public and let them know in what ways that they will benefit from the visit.
- *Explorations*: It includes the most featured exhibitions in the museum and detailed information on its theme and artifacts. This page also provides access to audio tours and maps.
- *Audio Tour*: This gives users access to the audio tour available in the museum. Besides audios, it includes interactive activities such as quizzes. [This page used to be Tickets which allows visitors to purchase tickets online in advance. They will also be able to get enrolled in the museum membership if they would like to. But in order to highlight the audio tour feature, I combined Tickets and Users.]
- *Maps*: Maps will locate the visitor on the map if they are visiting the museum. They will be able to locate not only exhibitions on the map, but also gift shops, food and drinks, and restrooms.
- *User*: This page is the customized information for the app user. Since they are allowed to buy tickets, save events or like exhibitions, they will be able to find them on this page. If the visitor has bought tickets through the app, they will also be able to see it here so there is no need for the physical ticket.



Wireframes:

I started my app with the wireframe in the initial phase and it gave a direct picture of the overall structure and design for ENIAC. It helps to map out the scale of the project and the depth of it. In order to determine how to organize information for the app, I drew these wireframes on the paper at first and the images below are some examples of it. After drawing them on the paper, I began to build the prototype with placeholders on Sketch, so I don't need to put all the details in right away. It enabled me to get a sense of feeling of the app and make adjustments when I felt the spacing between different parts need to be bigger and something needs to be highlighted.



Wireframes on Paper

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Welcome to Computer History Museum!

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Mauris porta consectetur nisl. Sed at vehicula justo. Nulla ac fermentum lorem. Etiam et auctor ligula, vel tincidunt felis. Integer nibh augue, bibendum quis euismod nec, porta a est. Quisque ultrices nulla felis, quis laoreet leo tincidunt sit amet.

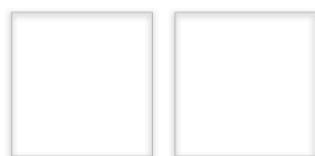
Hours:

Wed-Sun 10AM-5PM
* See Holiday and Special Hours

Events

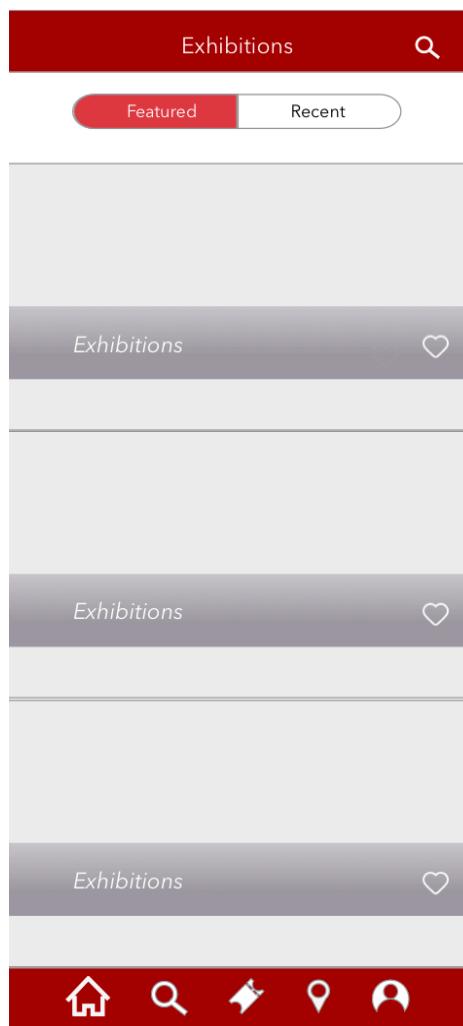


Highlights



Address:

1401 N Shoreline Blvd.
Mountain View, CA 94043



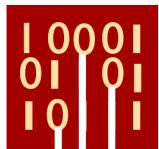
Wireframes on Sketch

Color Scheme & Design:

Theme Colors used in ENIAC were taken from the original Logo of Computer History Museum. Because of copyright issue, the logo was redesigned in the app. It still follows the same idea behind the logo and reflects the idea of computing and connecting. Pale grey and dark grey were used in the color Platte together with the red and yellow to show a feeling of professional and industrial.

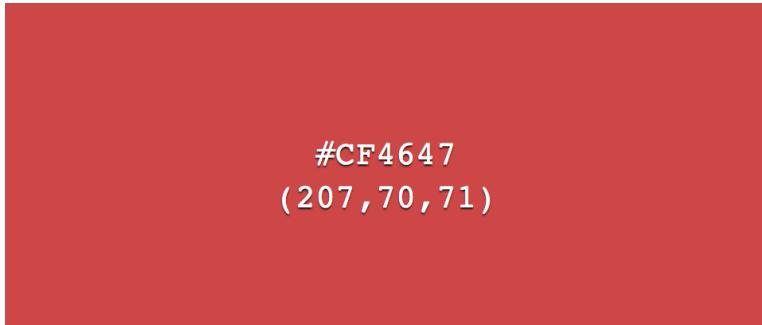


Original Logo of Computer History Museum

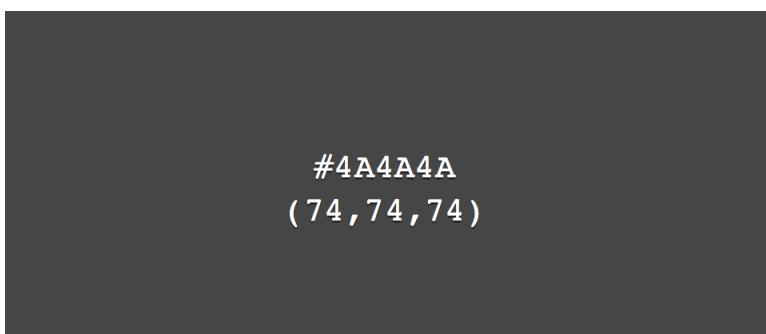
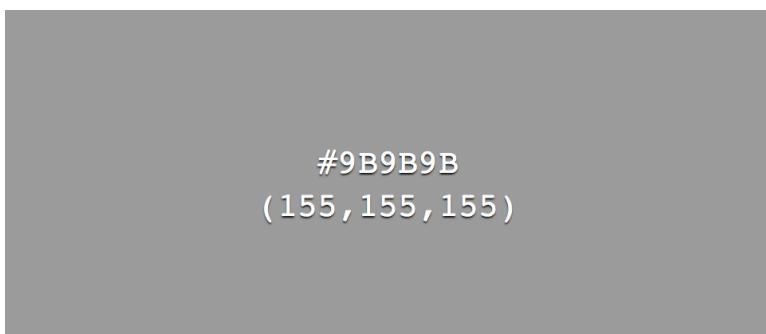


Re-designed Logo of ENIAC

#980101
(152,1,1)



#CF4647
(207,70,71)



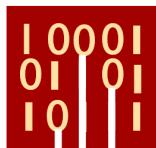
Navigation and Labeling:

To avoid confusions when navigating through the app, ENIAC has used a global navigation at the bottom of pages, so users can jump from the five major parts efficiently. As for the labeling of the navigation, I designed these icons which are commonly used in social media and mobile apps so that users can recognize them immediately. The selected icon will be highlighted so the user can easily figure out what page they are on.



Graphic designs:

I designed the following icons which would be more intuitive and concise than texts. When visitors are in the museum, they would be busy reading texts and understanding the artifact. These icons provide an intuitive way and save them time if they do not want to look at the text.

Icon	Meaning
	Redesigned Logo
	No flashlight photography
	Be aware of your surroundings.
	Batteries



Calendar



Badge



Ticket information

Content Exploration:

Content is one of the most crucial parts of the app and the goal is to make the information on computer history interactive and fun. In order to do this, I put some focuses on multimedia instruction (or a multimedia learning environment) which involves designing multimedia presentations that help people build mental representations (Mayer, 2005). These strategies include using words and pictures than from words alone and presenting messages in learner-paced segments rather than a continuous unit.

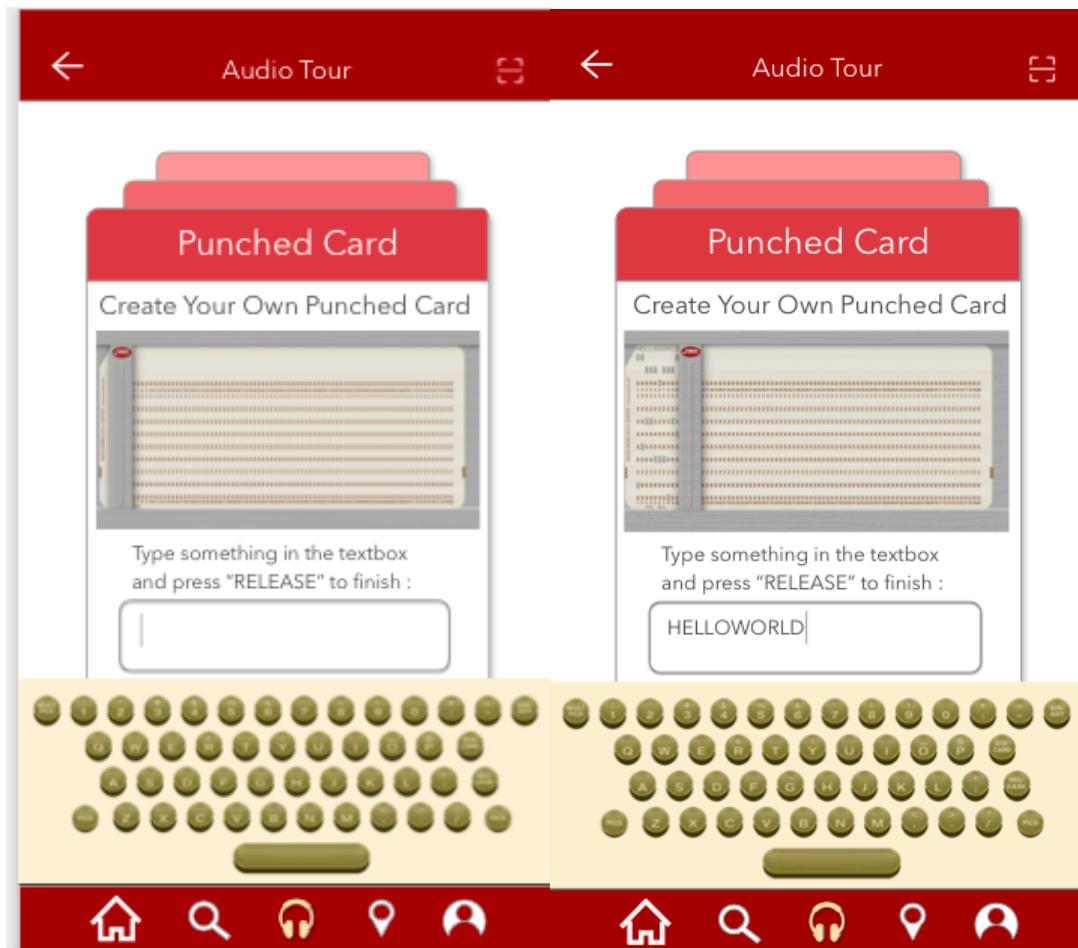
Audio Tour:

Instead of presenting information through texts, several activities are selected to highlight the most important information that users should be able to obtain from the museum. Since the scope of the museum is pretty broad, I was using the example of the most featured exhibition named *Revolution: The First 2000 Years of Computing*. In this exhibition, it explored a variety of topics, including calculators, punched cards, the birth of the computer, and supercomputers.

For Calculators, the learning goal is to understand that numbers are the language of computers. However, computers were born much later than people started to calculate things. How did people work with numbers before computers? The abacus was used in Europe, China and Russia centuries ago and it still remains common in some countries. It can also be used to teach arithmetic to children. Therefore, this part of the app basically explores the use of abacus and a small activity to do addition on the calculation. Users will be able to use beads on the virtual calculators to come out with the result. They will also be able to earn a badge if they get the right answer and the right abacus calculation on the screen.

The image displays two screenshots of a mobile application interface. Both screens have a red header bar with a back arrow, the text "Audio Tour", and a share icon. The first screenshot shows a red box labeled "Calculators". Below it, the text reads: "Try to do addition: **1234+5678** by using the abacus below:". An illustration of an abacus is shown. At the bottom, there is a text input field "Your answer: _____" and a yellow "Submit" button. The second screenshot shows the same setup but with a hand pointing to the abacus. The abacus has red beads and is set up to show the sum of 1234 and 5678, with the result "6912" displayed at the bottom in red. The "Your answer" field now contains "_6912_" and the "Submit" button is visible.

The punched card is another fun topic which illustrates how people counted and stored numbers in the small paper with hole patterns. The punched card machine was able to record information as patterns of holes in paper cards. Some young visitors may not have tried the machine before. As an interactive activity, users will be able to type something through the keyboard and see how it is turned into the small holes on the paper.



Another thing that is crucial is to deliver some essential information on computer history. “Know before you go” is the section that would be able to clarify visitors on some of the misconceptions on computer history. These are really simple questions, but they help visitors to build a perspective on the collective intelligence of human beings and appreciation on the early inventions of computers.

Audio Tour

←

Myth Busters

Who invented the computer?

A. Bill Gates (Microsoft)

B. Steve Jobs and Steve Wozniak (Apple)

C. The U.S. government

D. None of the above

←

Myth Busters

True or False: Computers must have a keyboard and a monitor in order to function.

True

False

Home Search Headphones Location Profile

Home Search Headphones Location Profile

The image shows two side-by-side screenshots of a mobile application interface. Both screens have a red header bar with a back arrow, the text "Audio Tour", and a share icon.

Left Screen (Question):

Section Title: Myth Busters

Text: What can I expect to learn about on my visit to the Computer History Museum?

Options:

- A. Dates and people's names
- B. How to code and write software
- C. Stories about innovation, successes and failures, and my role in history
- D. All of the above

Right Screen (Answer):

Section Title: Myth Busters

Text: Our aim is to have you understand wonderful stories about cool stuff (and the people who created the cool stuff!) that are captured in our exhibition. Of course, you will also learn about dates and people's names, but there will be lots to see and do, and we hope that you come prepared with lots of questions to ask.

Feedback: Correct



Exploration

This part introduces the exhibitions in the museum, including the main content of the exhibition and featured artifacts. It also gives access to locate the exhibition on the interactive map and access to the audio tour.

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The image shows two side-by-side screenshots of a mobile application interface. Both screens have a red header bar with a back arrow, the word "Exhibitions", and a share icon.

Left Screen (Revolution Exhibit):

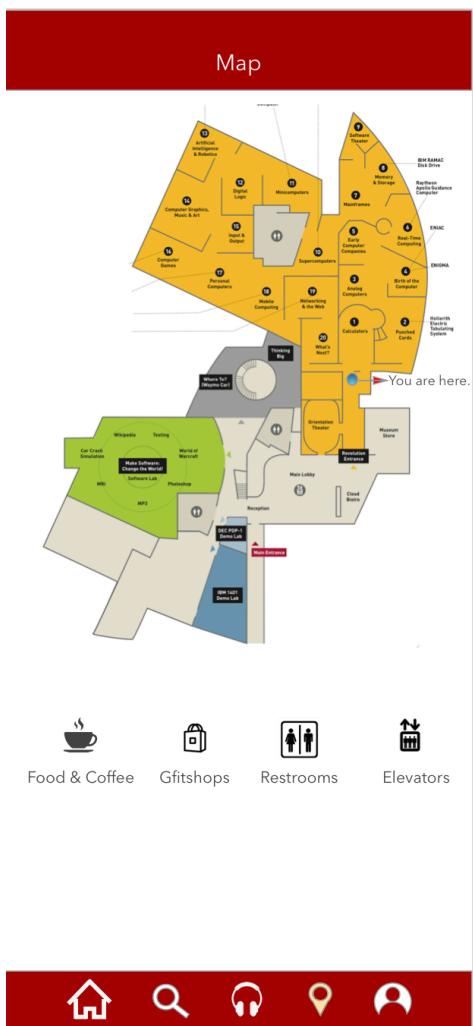
- Title:** Revolution: The First 2000 Years of Computing
- Icon:** A heart icon and a camera icon.
- Actions:** View on Map, Audio Tour.
- Description:** Everyone uses computers, but few know the story of how they came to be. Revolution: The First 2000 Years of Computing is an engaging 25,000-square-foot exhibition, featuring 19 galleries, 1,100 objects, and an array of original multimedia experiences that chronicle the history of computing on a global scale, from the abacus to the smartphone. Experience one-of-a-kind objects, devices, and software, while hearing the firsthand accounts from the innovators who set the computer revolution in motion.
- Featured Artifacts:** Pong, Apple II, Cray I.
- Bottom Bar:** Home, Search, Headphones, Location, User profile.

Right Screen (Make Software Exhibit):

- Title:** Make Software: Change the World!
- Icon:** A heart icon and a camera icon.
- Actions:** View on Map.
- Description:** Fly through World of Warcraft's fantastic world of Azeroth, learn Photoshop from the pros, try your hand at coding, and speed-text your way to victory in Make Software: Change the World! It explores the history, impact, and technology behind seven game-changing applications: MP3, Photoshop, MRI, Car Crash Simulation, Wikipedia, Texting, and World of Warcraft. The Stata Family Foundation Software Lab is at the center of the exhibition, where visitors are introduced to basic programming concepts and encouraged to try coding hands-on.
- Featured Artifacts:** Car Crash Simulation, Stata Software Lab.
- Bottom Bar:** Home, Search, Headphones, Location, User profile.

Map Page

The map is a feature that helps visitors to locate themselves in the museum. They will also be able to locate exhibitions, gift shops, food and drinks on the map. The blue dot on the map shows the current location of the user and different colors are used to highlight different exhibitions in the museum.



Modified Timeline

Dates	Milestone
3/14 – 3/21	<ul style="list-style-type: none">Visit the museum to find out user needs and focusesWireframe & StoryboardDecide color schemes and fontsDesign interactive activities for exhibitions pageWork on the homepage on Sketch

3/21 – 4/4	<ul style="list-style-type: none">• Work on prototypes of exhibitions and interactive maps• Finalize home page
4/4-4/18	<ul style="list-style-type: none">• Revise the prototype based on peer evaluation feedback• Add a few more interactive activities on the audio tour• Check if new features are needed
4/18-4/25	<ul style="list-style-type: none">• Test the prototype• Getting feedback and revise prototype• Work on documenting the process
4/25-5/2	<ul style="list-style-type: none">• Finalize the project

Prototype in InVision

The prototype of ENIAC is available here: <https://invis.io/QVG7S2H5CW4>

Potential Questions for the Users:

1. In order to avoid being too text-heavy, what other kind of activities can be added besides the audio (video) tour, quizzes, and badges?
2. Compared with visiting the museum without the app, do users feel they learned more or feel more engaged?
3. Is there any other information that can be helpful for the audience?
4. Is the overall structure of the app clear to users?

PHASE IV Evaluating

Evaluation

Evaluation of the app was done mainly through peer evaluation to better understand users' experience with the app and check if they have learned from it. Dr. Liu and Dr. Horton also provided feedback from the perspective of learning and design.

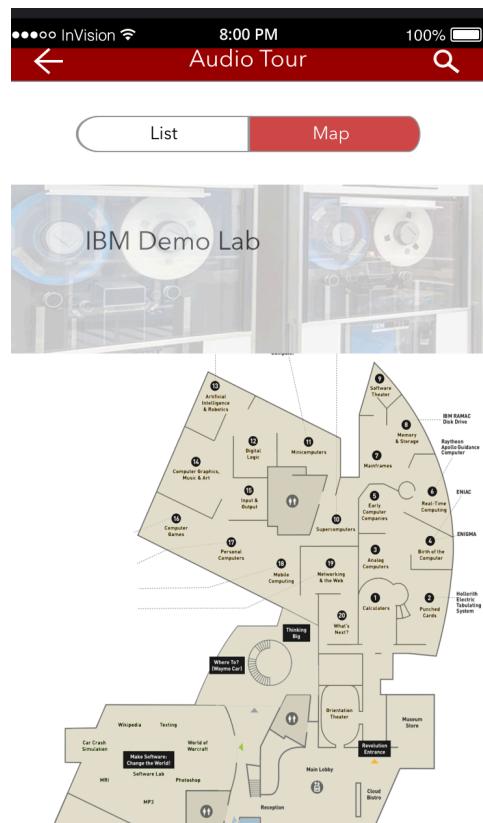
Overall, classmates found ENIAC would be useful when they are on a visit to the museum. The information provided is quite comprehensive and useful. The structure of the app is clear to them. Some of them liked the quiz idea and they said it is great to highlight events and exhibitions in the app.

Here are some feedbacks generated from the evaluation:

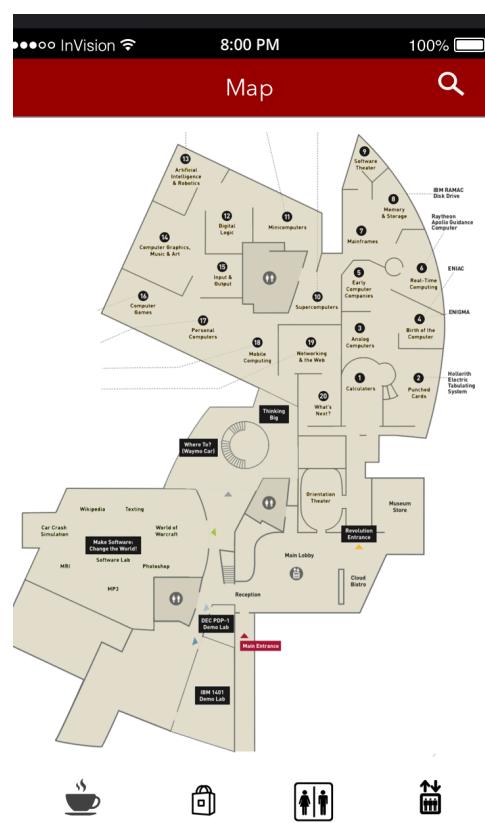
Feedback 1: The top maroon bar needs to be brought down a little. Also, it would be helpful to put the same logos on the top of the screen in order to show you are on that page. – Frances

Solution: The top bar has some issues when exporting from Sketch to InVision, and it is probably because of the screen sizes are different across different devices. In order to solve this issue, I change the header of the app from 50px to 65px so there are more spaces for the top bar. Also, I decided to highlight the icon on the bottom menu, so visitors can easily see what page they are on.

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Previous Design



Revised Design



Previous Design



Revised Design

Feedback 2: Creating more contrast on the buttons on the titles of the exhibitions by increasing the opacity. – Emily

Solution: In order to show a feeling of metallic and industrial, I still kept the background as gradient, but I used a different kind of grey for the background and also increased the opacity so it would be easier to read by visitors.



Previous Design



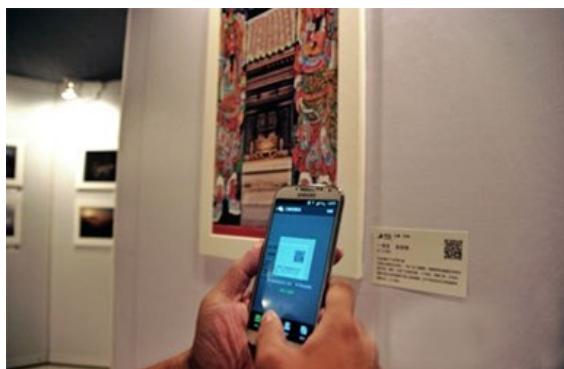
Revised Design

Feedback 3: It would be nice to have a notification with interesting facts in certain exhibits. – Alexia

Solution: I also generated some other ideas for the app. Emily suggested it would be helpful to allow users to scan a QR code next to an exhibition or artifact. I think it might be great to combine this with QR codes. This may be a great feature if the museum can put QR codes in the exhibitions and visitors can swipe them when they see the codes. By adding the feature of “scan QR codes”, visitors will be able to read interesting stories as they walked long the exhibition hall.

Exhibitions





Feedback 4: Some of my peers were not able to find the quiz. So I need to go through the flow again to see if there is anything missing.

This is something that I have been thinking a lot, since Audio Tour is a crucial part of the app and it is interactive. However, it is embedded deeply into the app and makes it hard to find. I am currently thinking of taking the audio tour as a button on the menu, so visitors can get access to them when they need to. But I don't think it is a good idea to have six buttons on the navigation. The solution I got right now is to put "Buy Tickets" into "My Account" since visitors will be able to see their bought tickets in that section. I also want to highlight the idea of buying tickets and membership on the homepage.



Previous Design



Revised Design

Feedback 5: Connect the badge feature to the actual museum experience. Establish strong consistency with the interface widgets, especially buttons. – Dr. Horton

I am going through the whole app again in order to build consistency across and I found that by moving Audio Tour to the global navigation, "Exploration", "Audio Tour", and "Map" can better integrate with one another and build the experience.

Feedback 6: The icon next to the “like” icon is a little bit confusing. It seems to indicate downloading or something. Also think about if getting badges would be helpful for users when they are on the actual museum visit. – Dr. Liu

The button intended to be “sharing” the exhibition to others, but it looks like “upload” icon. Therefore I changed it into another “share” icon which would make sense to the audience better.



Previous Icon



Revised Icon

References

Mayer, R. E. (Ed.). (2005). *The Cambridge handbook of multimedia learning*. Cambridge University Press.

Ventimiglia, P. & Pullman, G. (2016). From Written to Digital: The New Literacy. *EDUCAUSE Review*, 51(2), 36-48.

Wing, J. M. (2006). Computational thinking. *Communications of the ACM*, 49(3), 33-35.

Image Sources:

Abacus: <https://www.wikihow.com/Use-an-Abacus>

Punched card: <http://www.masswerk.at/keypunch/>