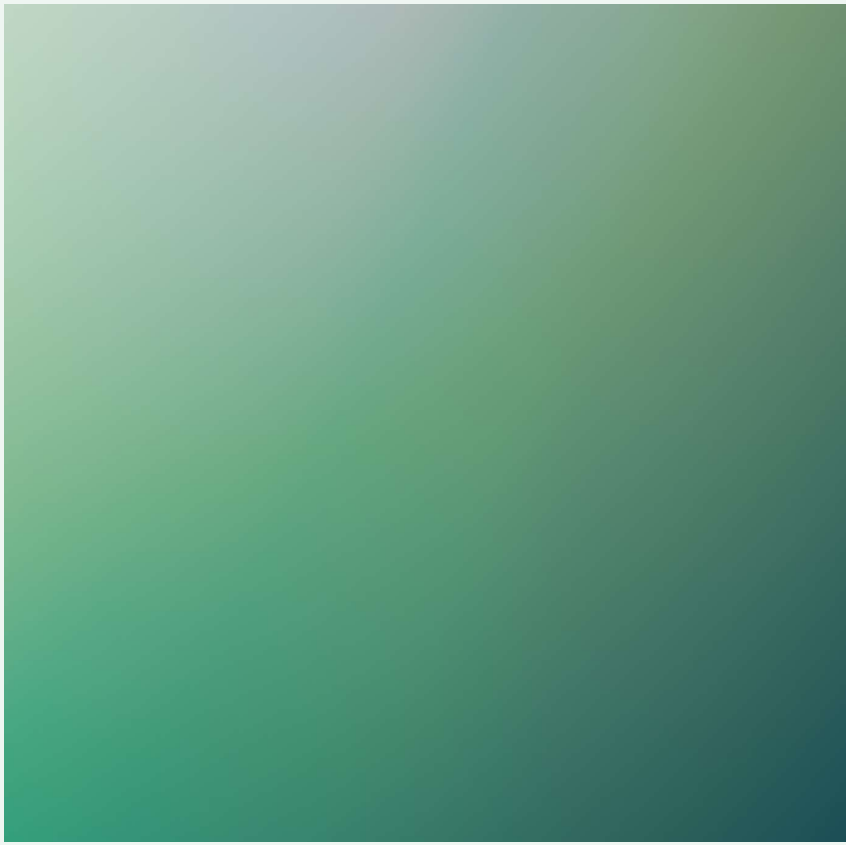
MIKEY

CSCE 483 CDR PRESENTATION



Oct 19 2022
Jackson Hagood, Andrew Imwalle, Brittany Jenkins, Connie Liu, Abhishek More, Max Smith

AGENDA

- Introduction
- Proposed Design
  - Updates
  - Hardware
  - Software
  - Modeling
- Project Management
- Updated Schedule
- Preliminary Results & Demo

PROBLEM STATEMENT

There exists a need for a simple assistive technology that can provide better computer hardware accessibility to individuals with Parkinson's disease or similar limited motor function capability.

RECAP OF ALTERNATE SOLUTIONS

Eye Tracking	Speech-to-Text
Oversized Keys	Customized Macros

UPDATES TO PROPOSAL DESIGN

Proposal Budget

Product Name	Cost
Raspberry Pi 0	79.99
LCD Displays	15.99
Keyboard Switches	47.98
O-rings	6.99
PLA Filament	18.99
PCB Material	~90

Total: ~260USD

Updated Budget

Product Name	Cost
Raspberry Pi Pico	13.25
LCD Displays	15.99
Keyboard Switches (Low Profile)	39.99
PLA Filament	18.99
PCB Material	~90

Total: ~180USD

SOFTWARE DESIGN - MENA

bit	0	1	2	3	4-7	8-15
usage	ALT	CTRL	SHIFT	WIN	(unused)	Character Key

Integer Value	Character Key
0-9	0-9
10-35	a-z
36	`
...	

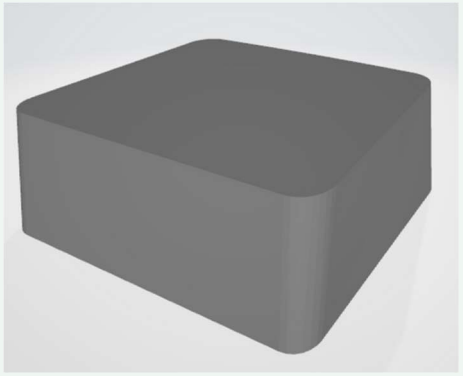
SOFTWARE DESIGN - AUTO-COMPLETE

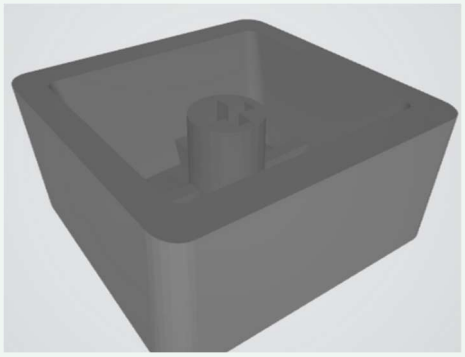
```
class Node {
    char character;
    bool isTerminal;
    Node* children[26];
    unsigned char priority[4];
}


class Trie {
    Node* root[26];
}
```

- Uses dictionary file (.txt) in priority order to construct Trie
- Priority array in nodes used for candidate traversal
- Modular domain used to avoid suggesting same word twice

MODELING DESIGN



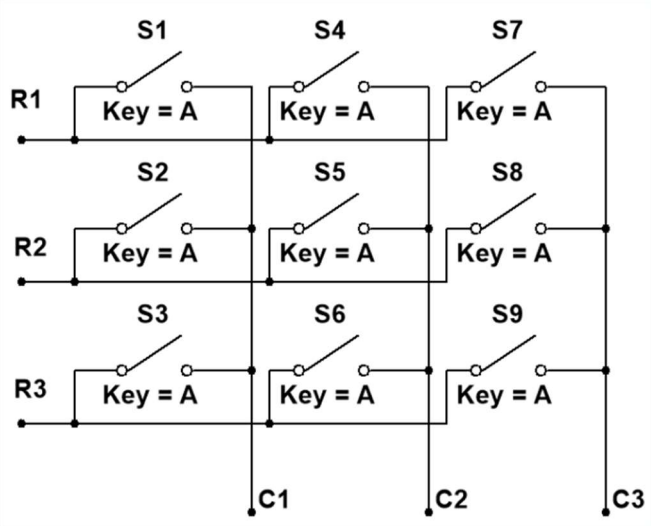


- Enlarged Keycaps to ensure ease of use
- Flattened tops of the key to allow mass production when 3D Printing
- Stem created to fit into the standard switch for

HARDWARE DESIGN

- Custom Keyboard layout
- Slim Red Switches
- Inset into frame
- 3 Autocomplete options appear on LCD Display

HARDWARE DESIGN



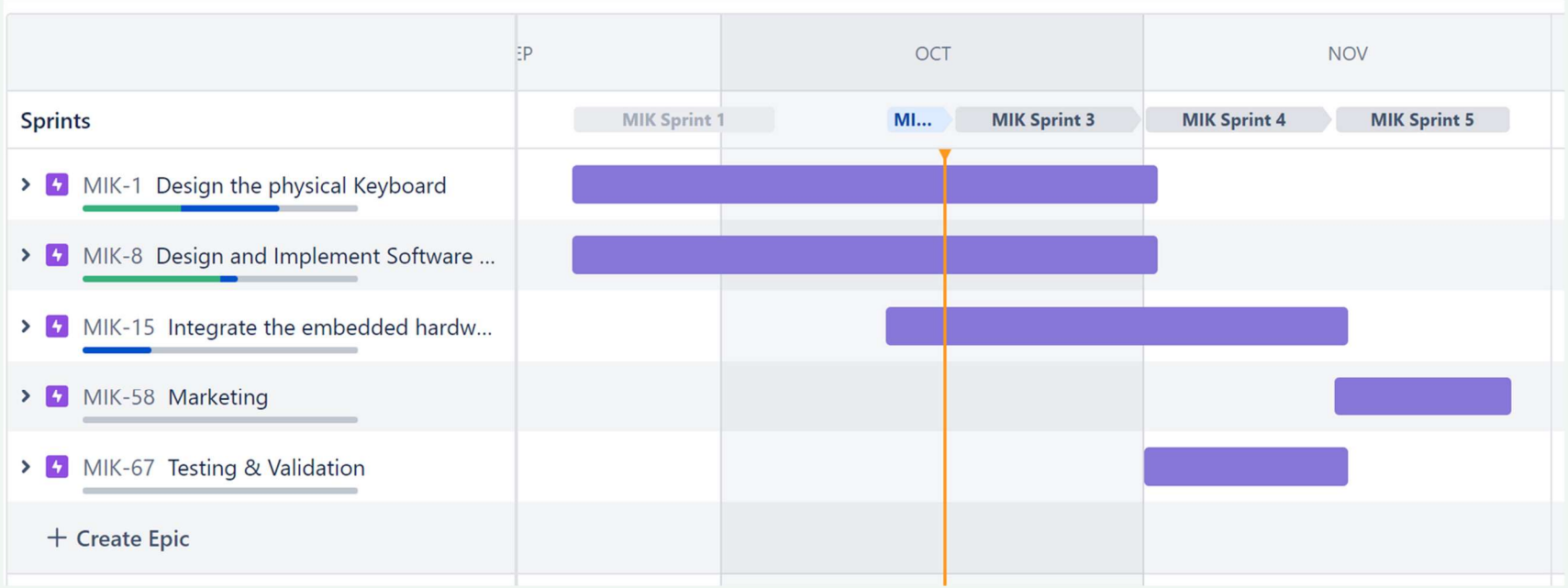
- Key Scanning Matrix
- Polling of matrix for keypress by secondary microprocessor
- Interrupt sent to primary microprocessor

PROJECT MANAGEMENT - ROLES

Technical Roles	Members
Software	Brittany, Connie, and Jackson
Hardware	Abhishek, Andrew, and Max
Modeling	Andrew and Jackson

Management Role	Members
Project Manager	Brittany
Software SCRUM	Jackson
Hardware SCRUM	Andrew
Finance	Abhishek
Reports / Notes	Connie and Max

UPDATED IMPLEMENTATION SCHEDULE

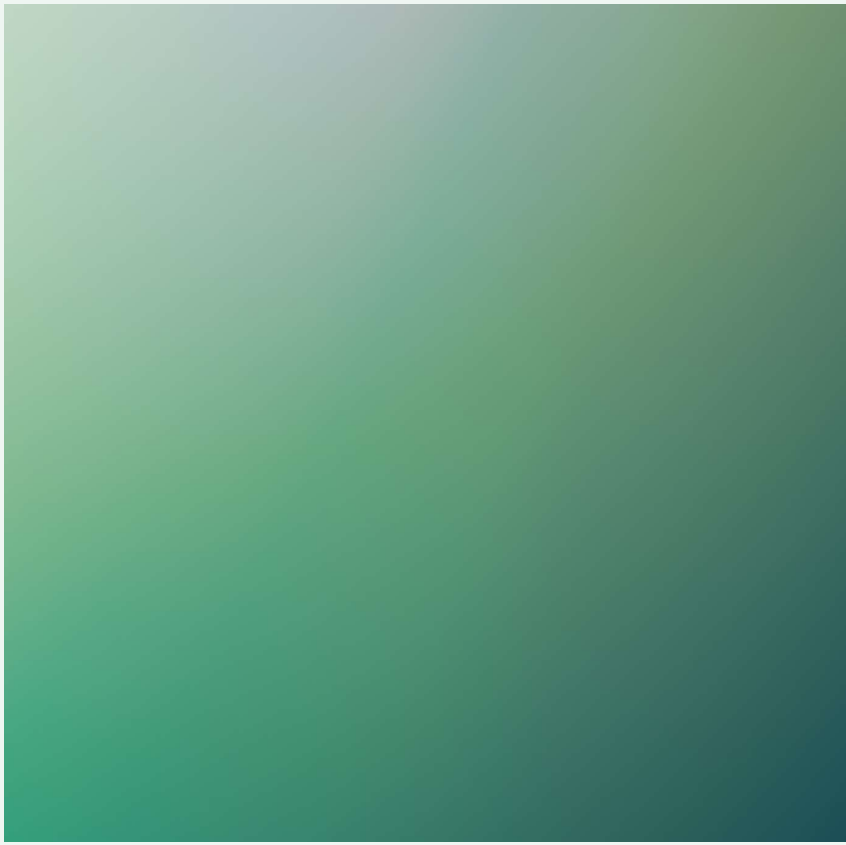


USER TESTING

Quantitative Tests in conjunction with semi-structured interview and anonymous questionaire

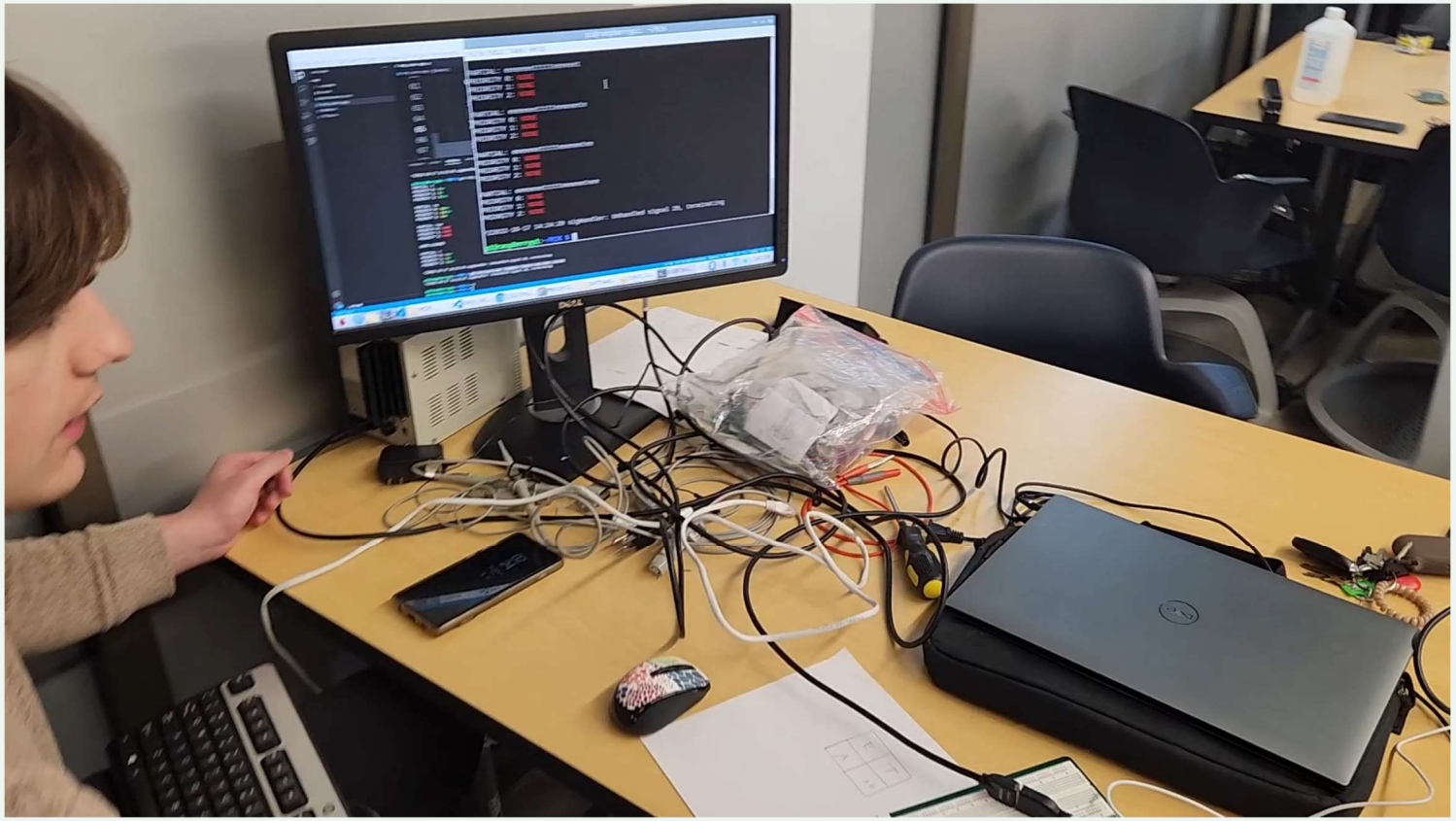
Q1: The MIK was easier to use than the standard keyboard				
Strongly Agree	Slightly Agree	Neutral	Slightly Disagree	Strongly Disagree
...				

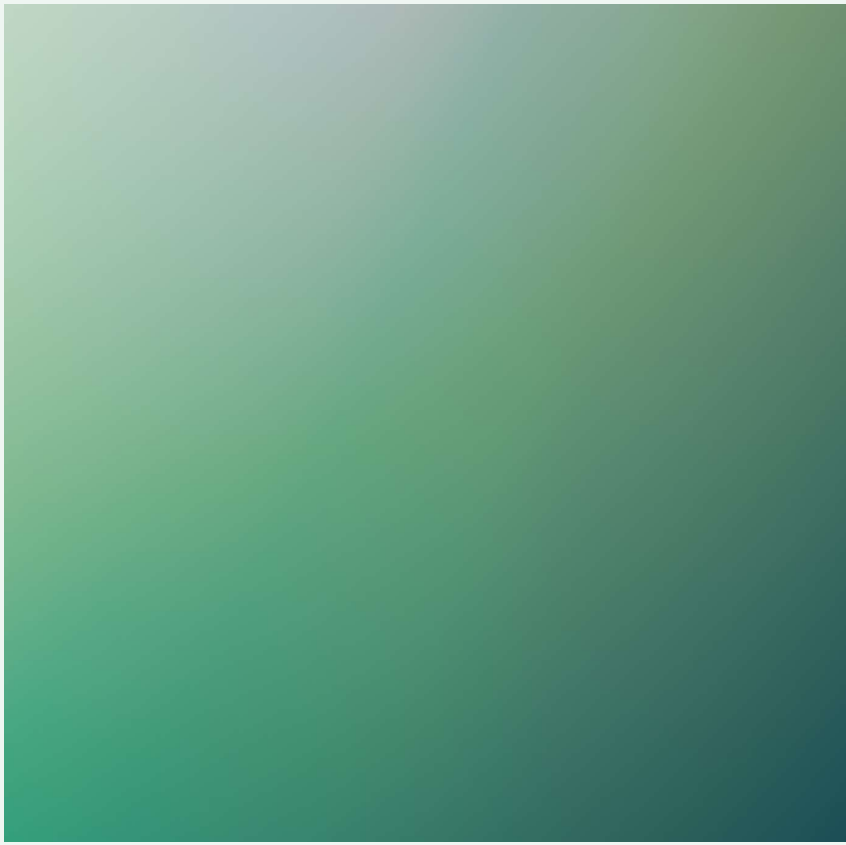
PRELIMINARY RESULTS & DEMO



AUTO-COMPLETE EXAMPLES

Input	Output
the	they their there
refe	reference references referred
introduce	introduced introduces NONE
asdf	NONE NONE NONE



THANK YOU!

QUESTIONS?