Robot Project Plan

Bethany Freeman
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1. Project Overview

Project Name: Oracle Orb
Purpose: The Oracle Orb is a fortune-telling robot designed to captivate and engage users through its interactive features. The robot features a spherical orb that appears to rotate smoothly through a pivoting mechanism. As it moves, a magical graphic displays across an LCD screen, creating a mystical atmosphere. Once the orb completes its motion, a randomized fortune appears on the screen, offering a unique interaction experience. The orb is enhanced with LED lights that circle around it, adding visual effects to emphasize its movement. The project combines mechanical design, coding, and electronics to create an engaging, fully autonomous fortune-telling device.

2. Milestone Chart

Milestone	Due Date	Description
1. Styrofoam Prototype Complete	10/21	Basic physical model using Styrofoam and wooden sticks for design
2. Fortune-Telling Algorithm Completed	10/23	Basic functionality of fortune selection
3. LCD Screen Integrated	10/25	LCD functionality added, magical graphic displays
4. Motor Controls Developed	10/31	Motor Control Code Written and Tested, Magical Graphics Disappear once motion stops
5. CAD Models Finalized	11/5	Complete CAD design for orb and base components
6. Finish 3D printing	11/11	Complete 3D printing all Robot parts
7. LED Integration	11/15	LEDs work in sync with robot's fortune-telling and motion
8. Final Assembly	11/29	Orb fully assembled and mechanics tested
9. Final Presentation demo-ready	12/4	Robot fully functional and ready for demo

3. Work Breakdown Structure (WBS)

1. Styrofoam Prototype Complete
    a. Buy: Styrofoam sphere(Roughly 6” in diameter), Styrofoam Cube (Roughly 6”x6”x6”), and wooden sticks that are sharp on both ends
    b. Shape potential base shape from styrofoam
    c. Test basic ideas for movement with different base shapes
2. Fortune-Telling Algorithm Completed
    a. Develop Pseudocode for main running algorithm
    b. Create library of fortune options
    c. Create pseudocode for Fortune-telling algorithm: this needs to pick a random fortune from the library of fortune options and return it.
    d. Code the solution.
    e. Test the solution.
3. LCD Screen Integrated
    a. Create code for LCD integration
    b. Set up an LCD display using an arduino and breadboard, etc.
    c. Create Magical Graphic.
    d. Test if stuff displays properly to the LCD Screen
    e. Determine the placement of the LCD screen on the sphere
    f. Document LCD dimensions and wiring requirements for proper fitting in the sphere
    g. Refine display output, ensuring smooth transitions between magical graphics and fortune display
4. Motor Controls Developed
    a. Develop pseudocode for motor control
    b. Write code for motor speed and direction control
    c. Determine motor placement within the sphere to allocate proper space for motor and wiring
    d. Test motor control separately from the base to ensure proper pivoting behavior
    e. Document motor dimensions and wiring needs for future integration
    f. Sync motor control with Fortune display and ensure the magical graphic disappears when motion stops and a fortune appears
    g. Refine Motor speed and smoothness for consistent pivoting
5. CAD Models Finalized
    a. Create Sphere in CAD
    b. Create Base in CAD: When creating the base, ensure electrical components are easily accessible
    c. Create Drawing for Sphere from CAD Model
    d. Create Drawing for Base from CAD Model
6. Finish 3D printing
    a. Complete Canvas course for Anderson Lab Access
    b. Export all CAD Models to 3D printing files
    c. Determine if my presence is required for the entire duration of my models 3D print time
    d. Schedule time appropriately for 3D printing based on the previous task
7. LED Integration
    a. Develop code to control LEDs
    b. Sync LED effects with the motor movement and fortune display
    c. Test LED synchronization with the orb’s movement and fortune-telling algorithm

    d. Refine the LED timing and effects for a visually dynamic experience
8. Final Assembly
    a. Assemble all 3D-printed components
    b. Install all electrical components (Arduino, motor, LEDs, LCD)
    c. Test full mechanical movement and visual effects
    d. Ensure all components work in sync
9. Final Presentation demo-ready
    a. Complete Robot Documents
    b. Create a final video demonstration the Oracle Orb in action
    c. Perform final tests to ensure smooth operation of all components
    d. Create an outline of what to talk about during robot demonstration

4. To-Do List

Name	Deliverable	Owner	When	Points	Status
Buy: Styrofoam sphere(Roughly 6” in diameter), Styrofoam Cube (Roughly 6”x6”x6”), and wooden sticks that are sharp on both ends	Supplies	Bethany	10/19	1	
Shape potential base shape from styrofoam	truncated square pyramid shape	Bethany	10/20	2	
Test basic ideas for movement with different base shapes	Final plan for shapes for both sphere and base	Bethany	10/21	3	
Develop Pseudocode for main running algorithm	How the entire sphere will run	Bethany	10/19	1	
Create library of fortune options	List of 20-30 fortune options	Bethany	10/19	1	
Create pseudocode for Fortune-telling algorithm	Finished pseudocode for algorithm	Bethany	10/20	2	
Code the solution	Finished fortune-telling Code	Bethany	10/23	3	
Test the solution	Each Path through code tested at least once	Bethany	10/23	3	
Create code for LCD integration	Finished LCD Code	Bethany	10/23	3	

Set up an LCD display	LCD Display useable	Bethany	10/24	4	
Create Magical Graphic	Magical Graphic when printed on screen is formatted correctly	Bethany	10/19	3	
Test if stuff displays properly to the LCD Screen	LCD Screen displays text properly	Bethany	10/24	2	
Determine the placement of the LCD screen on the sphere	Placement of LCD on sphere marked down	Bethany	10/22	2	
Document LCD dimensions and wiring requirements for proper fitting in the sphere	Documented dimensions and wiring requirements	Bethany	10/25	3	
Refine display output, ensuring smooth transitions between magical graphics and fortune display	Smooth transition between graphic and fortune text	Bethany	10/25	3	
Develop pseudocode for motor control	Finished motor control pseudocode	Bethany	10/26	2	
Write code for motor speed and direction control	Motor control code	Bethany	10/28	3	
Test motor control separately from the base	Motor pivots as expected	Bethany	10/30	3	
Determine motor placement within the sphere	Documented motor placement and space allocation	Bethany	10/30	3	
Document motor dimensions and wiring needs	Motor dimensions and wiring documented	Bethany	11/1	2	
Sync motor control with fortune display	Motor syncs with display, magical graphic disappears	Bethany	11/2	4	
Refine motor speed for consistent pivoting	Smooth, consistent motor pivoting	Bethany	11/3	3	

Create sphere and base in CAD	Complete CAD models of sphere and base	Bethany	11/4	5	
Complete Canvas course for Anderson Lab Access	Canvas says complete	Bethany	11/5	2	
Export CAD models to 3D printing files	Models ready for 3D printing	Bethany	11/6	2	
Schedule 3D printing and determine presence requirement	Scheduled 3D printing	Bethany	11/7	2	
Develop code to control LEDs	LED code completed	Bethany	11/9	3	
Sync and Test LED synchronization with orb movement and fortune-telling	LEDs sync with movement and fortune display	Bethany	11/10	3	
Refine LED timing and effects	LEDs visually dynamic, sync properly with orb	Bethany	11/12	3	
Assemble 3D-printed components	Fully assembled orb	Bethany	11/17	4	
Install electrical components (Arduino, motor, LEDs, LCD)	Installed electrical components	Bethany	11/20	4	
Test mechanical movement and visual effects	Full mechanical movement and visuals work as expected	Bethany	11/25	4	
Complete robot documents	All robot-related documents done	Bethany	11/30	2	
Create video demonstrating Oracle Orb	Final demonstration video	Bethany	12/1	3	
Perform final tests for demo	All components tested, ready for demo	Bethany	12/2	3	

Create outline for robot demonstration	Robot demonstration outline	Bethany	12/3	2	