Team Castle Quest

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Electronic Board Game for the Modern Player

- Electronic entertainment is no longer group-centric
- Virtually multiplayer, physically singleplayer
- Market and psychological demand for group centric games, especially board games

- Castle Quest is a electronic 4-player fantasy board game centered around an electronic Castle
System Requirements

- Meet child safety standards of Consumer Product Safety Commission
- Game should fit into a $1\text{ft}^3$ container
- Game should weigh < 5 lbs
- 10+ hours battery life
- Durability to survive transport and repetitive construction/deconstruction
- Support for up to 4 players
- Simple, intuitive gameplay mechanics
- Inexpensive
- Fun to play
Previous Block Diagram

Castle

PCB

Power Supply

Power Management

Processor/CPU

Motor

Data Management

Player Data

Game Data

UI

Buttons

LCD

Board

Buttons/Screens

Memory

Leaderboard

Game State
Updated Block Diagram

- Board: LEDs
- Memory: Leaderboard, Game State
- PCB: I/O
- Power Supply
- Motor
- Raspberry Pi: Data Management
  - Player Data
  - Game Data
- UI: Screen, Speaker
- USB

Electrical and Computer Engineering
Design Changes

- LED position display on board
- PCB handles I/O
MDR Deliverables

- Prototype Castle Model
- Prototype game board and UI
- Finalized gameplay
- Code system overview
- PCB design - breadboard mock-up
Prototype Castle Model
- Simplistic Interface
- Programmed using Java Swing
- Eclipse WindowBuilder plug-in, JVider plug-in
Player Start

Inventory

Move Selection

PLAYER ONE

INVENTORY

MOVE

STATUS

G: 250

DISEASED: 1/2 HP

HP: 90

CP: 15

F: 15

INVENTORY

INVENTORY

INVENTORY

BAZAAR

CAVES

MOVE

MOVE

MOVE

DESSERT

FORREST
Combat

**PLAYER**

- Lightning: 5
- Sword: 3
- Cross: 43
- Shield: 15

**BANDITS**

- Lightning: 3
- Sword: 15
- Cross: -2
- Shield: -1

Bazaar

**ITEM**

- Sword: 5, Price: $50 (+1)
- Shield: 15, Price: $25 (-2)
- Thief: Price: $75
- Plagued Rats: Price: $75
- Poisoned Apple: 4, Price: $40

**PRICE**

- Sword: $50
- Shield: $25
- Thief: $75
- Plagued Rats: $75
- Poisoned Apple: $40

**BUY**

- Sword
- Shield
- Thief
- Plagued Rats
- Poisoned Apple
UI Design Cont.

- UI will be implemented by David
**Castle Quest**

**Game Description:**
Castle Quest is a game of fantasy adventure that takes up to 4 players on an epic journey through the four kingdoms of Derelin, Wybengland, Lassalla, and Margia. When traveling the lands, the players must collect three Keys of Greatness to be able to open the gates to the Castle. Through their travels the players will encounter bandits, slay monsters, fear dragons, and become heroes by defeating the evil within the Castle!

**Taking a Turn:**
A player’s turn consists of up to three actions:

1. Checking Inventory:
   - Basic inventory consisting of Health Points (HP), Combat Power (CP), Gold (G), Food (F), and number of Keys (K) will always be displayed on the screen closest to the player.
   - Other inventory such as Weapons, Armor, Traps, and Special Items can be viewed by tapping the ‘Inventory’ button at the beginning of the turn.

2. Moving:
   - Players get to move one space per turn. Potential moves are presented by the screen on the tower, which the player can choose from in order to progress.
   - Each move drains one Food (except for Deserts and Mountains, which drain two).

3. Interacting with a Space:
   - Depending on the space, various Events can occur that the player has to deal with.

**Types of Spaces:**
Active spaces cause an action that the player needs to react to while Passive spaces often don’t cause an interaction. However, any space besides the Bazaar and Castle Gates can be Trapped, so use caution.

**Players Manual**
- Describes rules and gameplay
- 7 Page Document
Game Board Layout

- Board will be repeating quadrants of 16 spaces
- Made from polypropylene sheet with a graphical overlay
Code System Overview

- CastleQuest java project
- Interfaces for each class with defined methods
- FSM defines game flow and will be used to build Main
- README_CODE.txt
Finite State Machine

Beginning of players turn, display movement choices

Display inventory, Update Inventory

Check inventory

Close inventory

Choose Space, Update food, Update Board

Use Potion, Update CP/HP

Set Trap, update space

Active Space

Combat

Enter Action

Interaction

Update Inventory, space

Passive Space

Key

Trap

Next player

End of round

Player Found

Move Dragon

Update Inventory, space

Combat

Update Inventory, space

Next player

Update Inventory, space

Closed inventory

Lost

Next player

Start

Update Inventory, space

Next player

Update Inventory, space

Combat
PCB Design

Handles numerous LED I/O pins

- Currently implements 6 pins for the demo
- 52 needed for actual game board
- Utilize I/O Expander: MCP23017 with I2C pins on pi
What David Did

- Sent weekly team To-Dos and organized meetings
- Designed Gameplay with Eric
- Created Gameplay FSM
- Put Castle into CAD with Fusion360
- Designed the Java interfaces with Sarah
- Designed UI
What Eric Did

- Set up Github Page
- Installed touchscreen specific OS to pi
- Configured touchscreen for use in portrait mode
- Designed Gameplay with David
- Designed board LED layout with Dev
- Debugged hardware I/O and pin usage
- Wrote LED code and prepared Demo
What Sarah Did

- Created java project in Eclipse
- Designed java interfaces and code outline with David
- Worked on gameplay FSM
- Ordered parts, Budget
What Dev Did

- Blueprinted Tower Model
- Designed board LED layout with Eric
- Wired Breadboard
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<th>Item</th>
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<td>Raspberry Pi</td>
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<td>Castle - 3D printing</td>
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CDR Deliverables

- Fully Implemented Java Project - Sarah
  - Able to “play game” through command line
- PCB Prototype soldered - Dev
- Functioning LED matrix - Eric
- Printed Castle - David
- Finished UI - David
- Game Board Mock Up - Dev
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DEMO
QUESTIONS?