Department of Computer Science & Engineering
The University of Texas at Arlington

System Requirements Specification
CSE 4316: Senior Design I
Fall 2019

oVRworked
Cookums

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Revision History

Revision	Date	Author(s)	Description
0.1	11.05.2019	QT, KT	document creation

CONTENTS

List of Figures

1 Product Concept

This section describes the purpose, use and intended user audience for the Cookums game. The Cookums game is a VR game that will allow players to play in a simulated food truck. The player will be given orders, prepare the food, deliver the food, and will then be rated on performance.

1.1 Purpose and Use

The product is used as a fun game that simulates a worker inside a food truck, and should be entertaining for players.

1.2 Intended Audience

Customers should be in the age range of 14 to 40 years old. It is intended for customers who have full range of motion as it will require speedy physical movement to play. It is intended for gamers who have some interest in cooking.

Figure 1: Cookums Logo

2 Product Description

This section provides the reader with an overview of the Cookums game. The primary operational aspects of the product, from the perspective of end users, maintainers and administrators, are defined here. The key features and functions found in the product, as well as critical user interactions and user interfaces are described in detail.

2.1 Features & Functions

The player will be in a food truck which will contain a window with a flat surface for the player to sit finished orders on for customers (Figure Food Truck Front/Back Angle). There will also be cooking equipment (Figure Food Truck Front/Back Angle), which will consists of cooking devices and food dispensers. The will also be an order display screen (Figure Food Truck Side Angle) which will display orders for the player to make. The order display screen will display a single order at a time using a graphical display (Figure Order Display). The player will print a reciept for an order when it is finished to indicate the order is complete and the customer ai should pick up the particular order.

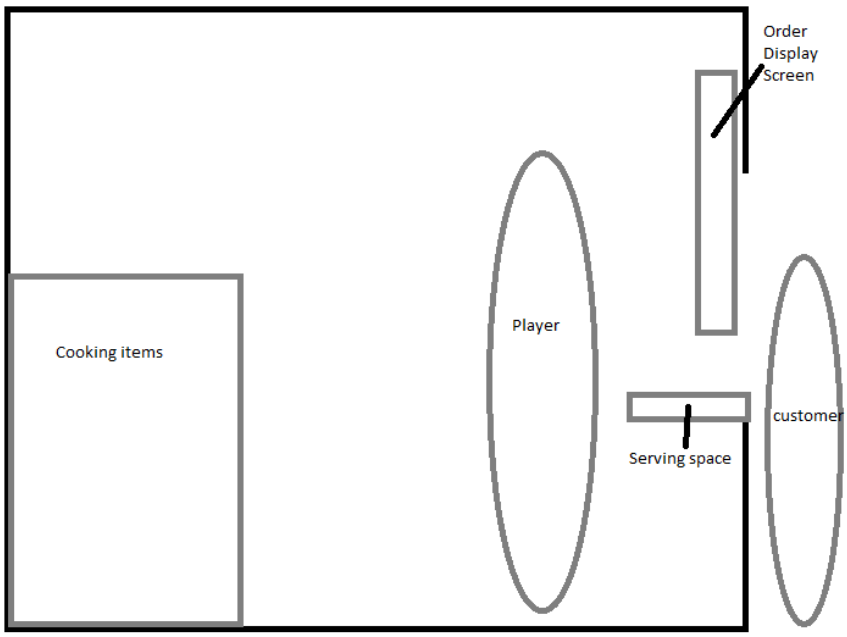

Figure 2: Food Truck Front/Back Angle

2.2 External Inputs & Outputs

The system will receive input from the VR equipment, and will return visual output back to the users VR equipment. There may be haptic output for VR controllers.

2.3 Product Interfaces

Product interface will be the worldspace rendering handled by VR equipment. There will be no heads up display in the head mounted device.

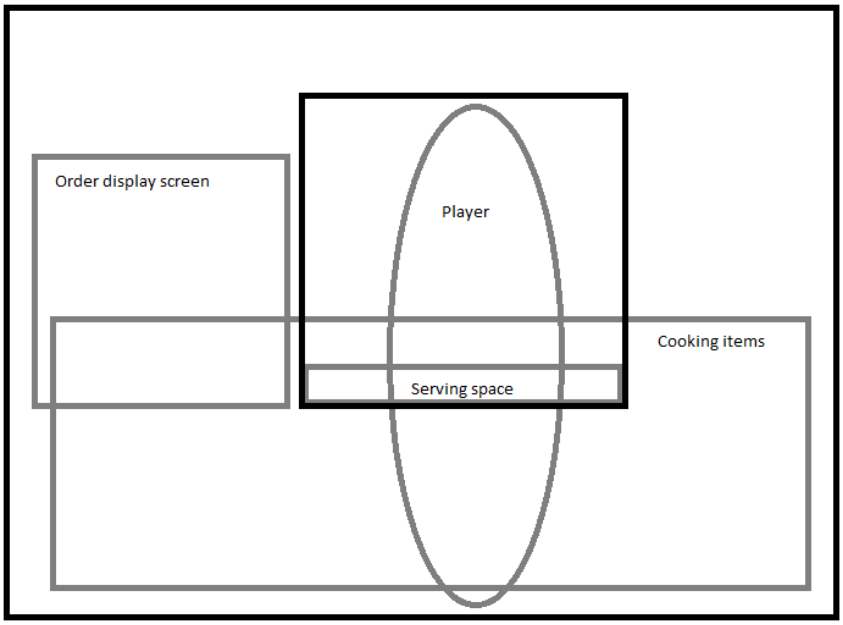

Figure 3: Food Truck Side Angle

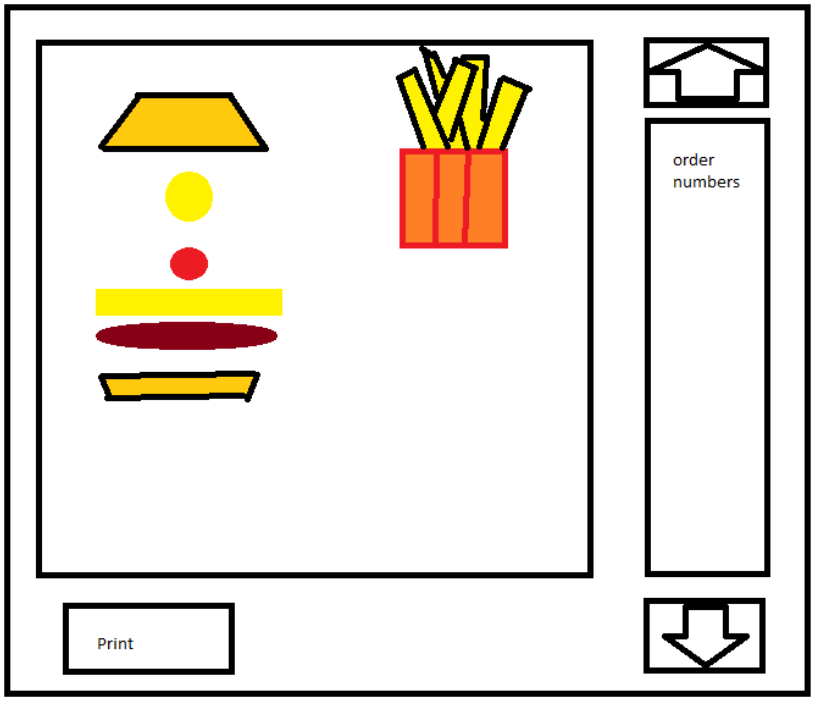

Figure 4: Order Display

3 Customer Requirements

The player will be tasked with preparing food for customers inside a food truck. The game will have a variety of foods the player can cook, and will give the player several oppurtunities to make mistakes during the process of cooking and serving the food. The player will be scored on their performance.

3.1 Gameplay will be confined in food truck

3.1.1 Description

Game area will resemble the inside of a food truck. The player should not ever leave the food truck. The food truck should have a consistient look and feel of a food truck.

3.1.2 Source

Team

3.1.3 Constraints

N/A

3.1.4 Standards

N/A

3.1.5 Priority

Critical

3.2 Player will be able to cook food

3.2.1 Description

Player will be able too cook a variety of food, including hamburgers, hotdogs, and fries. The player may improperly cook food by burning it or putting it on the wrong heatsource.

3.2.2 Source

Team

3.2.3 Constraints

N/A

3.2.4 Standards

N/A

3.2.5 Priority

Critical

3.3 Player will be able to serve food

3.3.1 Description

The player will be able to submit orders at an order window. Customers will pick up food when the player has completed the order.

3.3.2 Source

Team

3.3.3 Constraints

N/A

3.3.4 Standards

N/A

3.3.5 Priority

Critical

3.4 Player will be able to teleport around the truck

3.4.1 Description

The player will be able to teleport to areas around the truck floorspace, since there may not always be enough space to walk freely.

3.4.2 Source

Team

3.4.3 Constraints

The player cannot teleport outside of the truck.

3.4.4 Standards

N/A

3.4.5 Priority

Critical

3.5 Customer will appear as visual representations of orders and exhibit human like behaviour

3.5.1 Description

Visible customers will order and pick up food in a human like fashion.

3.5.2 Source

Team

3.5.3 Constraints

The customers must visibly order and pick up food in a natural manner. The customers may have a low poly art style.

3.5.4 Standards

N/A

3.5.5 Priority

Low

3.6 Player cooking and serving performance will be scored

3.6.1 Description

Submitted orders will be scored against the accuracy of the order and timeliness of the order.

3.6.2 Source

Team

3.6.3 Constraints

N/A

3.6.4 Standards

N/A

3.6.5 Priority

Critical

3.7 Players head shall not be moved without player head input

3.7.1 Description

The head of the player serves as the camera for the player, and should never be moved since it feels unnatural and causes nausea.

3.7.2 Source

Team

3.7.3 Constraints

The head of the player shall not be moved by the game. The scene of the game shall not have motion that the player cannot feel.

3.7.4 Standards

N/A

3.7.5 Priority

Critical

3.8 Food should be snapped to eachother to stay on a plate

3.8.1 Description

The nature of VR games makes it so that physics are a big part of the gameplay. However, it would be difficult to balance food on a plate since there is no real weight feedback. Making food easy to keep on a plate will help with frustration.

3.8.2 Source

Team

3.8.3 Constraints

The physics calculations can not significantly reduce the performance of the game.

3.8.4 Standards

N/A

3.8.5 Priority

High

3.9 An order director shall generate orders for the player to fulfill

3.9.1 Description

An order director will generate orders of varying difficulty for the player to fulfill, and will be psuedo-random. The generator will factor in how well the player is doing.

3.9.2 Source

Team

3.9.3 Constraints

The order director can not create orders that violate standard food rules.

3.9.4 Standards

N/A

3.9.5 Priority

Critical

3.10 There shall be food rules to avoid strange snapping

3.10.1 Description

A set of rules, such as hamburger ingredients can only go with hamburger ingredients, will prevent strange stacks of food being submitted.

3.10.2 Source

Team

3.10.3 Constraints

N/A

3.10.4 Standards

N/A

3.10.5 Priority

High

3.11 The game shall not start until a lever is pulled to begin the level

3.11.1 Description

There will be a lever that opens the truck's side in order to be open for business. The lever will initiate ordering.

3.11.2 Source

Team

3.11.3 Constraints

N/A

3.11.4 Standards

N/A

3.11.5 Priority

Moderate

3.12 Orders are submitted with a ticket

3.12.1 Description

In order to keep track of what order the player submits to the window, each order will be submitted with a ticket identifying the order.

3.12.2 Source

Team

3.12.3 Constraints

N/A

3.12.4 Standards

N/A

3.12.5 Priority

Critical

3.13 Food objects are dispensed from dispensers

3.13.1 Description

Dispensers will dispense a specific food object, and will be place in the game to dispense different types of food objects. The dispensers will respawn the food after a small delay.

3.13.2 Source

Team

3.13.3 Constraints

N/A

3.13.4 Standards

N/A

3.13.5 Priority

Critical

3.14 Height of object in truck change with height of player

3.14.1 Description

In order to accomodate players of every height, the window, counters, and equipment on the walls will adjust their height based on the height of the player at the start of the game.

3.14.2 Source

Team

3.14.3 Constraints

The height of objects should not exceed or go below a level that ruins the appearance of the truck.

3.14.4 Standards

N/A

3.14.5 Priority

Moderate

3.15 Game has accompanying music and sounds

3.15.1 Description

The game shall have music to accompany the gameplay and enhance the feeling of fun.

3.15.2 Source

Team

3.15.3 Constraints

Music must be sourced with permissive licenses. Paying someone to create music is not allowed.

3.15.4 Standards

di N/A

3.15.5 Priority

Moderate

3.16 Overcooking food will cause fires to spread in the kitchen

3.16.1 Description

The spreading of fire will add a chaotic and fun element, and will occur when food has been burnt for too long. Fire will also exacerbate other items not yet on fire.

3.16.2 Source

Team

3.16.3 Constraints

The spreading of fire can not significantly reduce the performance of the game. The fire can not spread to the player's own hands or head.

3.16.4 Standards

N/A

3.16.5 Priority

Future

3.17 Food shall track hygeine

3.17.1 Description

Keeping track of the cleanliness of a food object will add an additional layer of complexity and nuance to gameplay. The floor will serve as a dirty area.

3.17.2 Source

Team

3.17.3 Constraints

N/A

3.17.4 Standards

N/A

3.17.5 Priority

Future

3.18 Food has a heat component that prevents pickup

3.18.1 Description

Food objects will keep track of heat and will force the player to drop the object if it is picked up.

3.18.2 Source

Team

3.18.3 Constraints

N/A

3.18.4 Standards

N/A

3.18.5 Priority

Future

3.19 Food requires cooking on multiple sides to be thoroughly cooked

3.19.1 Description

Food objects will need more dedicated cooking (flipping, turning) in order to be correctly cooked.

3.19.2 Source

Team

3.19.3 Constraints

N/A

3.19.4 Standards

N/A

3.19.5 Priority

Future

4 Packaging Requirements

The Software will be compiled into an executable created by Unity with any other Unity required files associated with the executable. The collection of files created will be distributed via online game stores for customers to download from.

4.1 Unity Output

4.1.1 Description

The files distributed to customers will be created by Unity from our source code in the form of an executable.

4.1.2 Source

Team

4.1.3 Constraints

Unity output must execute on Windows.

4.1.4 Standards

N/A

4.1.5 Priority

High

4.2 Download Online

4.2.1 Description

After the game is complete, a binary will be uploaded onto an online game store for users to purchase and download.

4.2.2 Source

Team

4.2.3 Constraints

Users must be able to purchase and download game.

4.2.4 Standards

N/A

4.2.5 Priority

Low

5 Performance Requirements

The game should run fast enough to not display any visible stutter, lag, dropped frames, or cause motion sickness. The player should feel that all actions are reacted to in a reasonable amount of time. The game is expected to run on a (fill in) graphics card. A Vive is used for VR functionality.

5.1 No Stutter, Lag, or Dropped Frames

5.1.1 Description

The player should not see any stutter, lag, or dropped frames.

5.1.2 Source

Team

5.1.3 Constraints

Players should report no lag, stutter, or dropped frames.

5.1.4 Standards

N/A

5.1.5 Priority

Critical

5.2 No Motion Sickness

5.2.1 Description

The player should not have any motion sickness during use.

5.2.2 Source

Team

5.2.3 Constraints

Players should not report motion sickness during use.

5.2.4 Standards

N/A

5.2.5 Priority

Medium

6 Safety Requirements

Product must be used in a safe enviroment with the play area free of dangerous objects. Dangerous objects could be sharp edges, steps and/or drop offs, or other dangerous items.

6.1 Laboratory equipment lockout/tagout (LOTO) procedures

6.1.1 Description

Any fabrication equipment provided used in the development of the project shall be used in accordance with OSHA standard LOTO procedures. Locks and tags are installed on all equipment items that present use hazards, and ONLY the course instructor or designated teaching assistants may remove a lock. All locks will be immediately replaced once the equipment is no longer in use.

6.1.2 Source

CSE Senior Design laboratory policy

6.1.3 Constraints

Equipment usage, due to lock removal policies, will be limited to availability of the course instructor and designed teaching assistants.

6.1.4 Standards

Occupational Safety and Health Standards 1910.147 - The control of hazardous energy (lockout/tagout).

6.1.5 Priority

Critical

6.2 National Electric Code (NEC) wiring compliance

6.2.1 Description

Any electrical wiring must be completed in compliance with all requirements specified in the National Electric Code. This includes wire runs, insulation, grounding, enclosures, over-current protection, and all other specifications.

6.2.2 Source

CSE Senior Design laboratory policy

6.2.3 Constraints

High voltage power sources, as defined in NFPA 70, will be avoided as much as possible in order to minimize potential hazards.

6.2.4 Standards

NFPA 70

6.2.5 Priority

Critical

6.3 RIA robotic manipulator safety standards

6.3.1 Description

Robotic manipulators, if used, will either housed in a compliant lockout cell with all required safety interlocks, or certified as a "collaborative" unit from the manufacturer.

6.3.2 SOURCE

CSE Senior Design laboratory policy

6.3.3 CONSTRAINTS

Collaborative robotic manipulators will be preferred over non-collaborative units in order to minimize potential hazards. Sourcing and use of any required safety interlock mechanisms will be the responsibility of the engineering team.

6.3.4 STANDARDS

ANSI/RIA R15.06-2012 American National Standard for Industrial Robots and Robot Systems, RIA TR15.606-2016 Collaborative Robots

6.3.5 PRIORITY

Critical

7 Maintenance & Support Requirements

7.1 Maintenance

7.1.1 Description

The game will be supported for up to six months after release. Maintenance will not include upgrades to current code base. Maintenance will only provide labor to keep code running as is.

7.1.2 Source

Team

7.1.3 Constraints

Code will be maintained to remain as is with no upgrades to code base.

7.1.4 Standards

N/A

7.1.5 Priority

Low

8 Other Requirements

The game must function on Windows. The game must be easy to transfer or install between Windows machines.

8.1 Game must run on Windows

8.1.1 Description

The game must be able to run on Windows 10 machines. The game must be easy to install on said machine.

8.1.2 Source

Team

8.1.3 Constraints

The only windows machines tested will be running Windows 10.

8.1.4 Standards

N/A

8.1.5 Priority

Critical

9 Future Items

9.1 Overcooking food will cause fires to spread in the kitchen

9.1.1 Description

The spreading of fire will add a chaotic and fun element, and will occur when food has been burnt for too long. Fire will also exacerbate other items not yet on fire.

9.1.2 Source

Team

9.1.3 Constraints

The spreading of fire can not significantly reduce the performance of the game. The fire can not spread to the player's own hands or head.

9.1.4 Standards

N/A

9.1.5 Priority

Future

9.2 Food shall track hygeine

9.2.1 Description

Keeping track of the cleanliness of a food object will add an additional layer of complexity and nuance to gameplay. The floor will serve as a dirty area.

9.2.2 Source

Team

9.2.3 Constraints

N/A

9.2.4 Standards

N/A

9.2.5 Priority

Future

9.3 Food has a heat component that prevents pickup

9.3.1 Description

Food objects will keep track of heat and will force the player to drop the object if it is picked up.

9.3.2 Source

Team

9.3.3 Constraints

N/A

9.3.4 Standards

N/A

9.3.5 Priority

Future

9.4 Food requires cooking on multiple sides to be thoroughly cooked

9.4.1 Description

Food objects will need more dedicated cooking (flipping, turning) in order to be correctly cooked.

9.4.2 Source

Team

9.4.3 Constraints

N/A

9.4.4 Standards

N/A

9.4.5 Priority

Future

References

N/A