

Software Requirements Specification

1. Introduction

1.1 Purpose

This SRS describes the functional requirements for the initial release of ECHO (V0.1). This document is intended to be used by the project members who will implement and verify the correct functions of the audio game, ECHO. Guidelines specified in this document will facilitate the processes of ensuring a coherent entertainment experience and maximum accessibility for target users. In addition, users who are able to read this document should have a better understanding of relevant game controls and mechanics.

1.3 Project Scope

[Vision and Scope Document](#)

1.4 References

1. Hasty, Tyler; Bolanos, Eduard; Pelton, Charles; Iseri, Timothy. [Trello](#)
2. Android Developer. *MediaPlayer Class*, [Android API](#)
3. Android Developer, *Vibrator Class*, [Android API](#)
4. Android Developer, *Input Events Overview*, [Android Docs](#)

2. Overall Description

2.1 Product Perspective

This product is the conception of a thought experiment in which the medical condition of blindness/visual impairment was analyzed with respect to its impact on the ability of an afflicted user to experience digital games.

2.2 User Classes and Characteristics

User Class	Description
Player	Individuals (users) who interacts with ECHO, experiencing each game mechanic as intended and without inhibition; all interfaces intended for playing the game will be available to this user
Developer/ Tester	This user will have access to special debugging facilities which may involve visual interfaces not present in the final release

2.3 Operating Environment

OE-1: ECHO shall operate correctly on the following Android devices: Smartphones.

OE-2: ECHO shall operate on the following versions of Android:

3. System Features

3.1 Start New Game

ID:	UC-1	Name:	Start New Game
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	None
Description:	User progresses through a sequence of 3 menu items in order to start a new game. System starts a new game from first level.		
Trigger:	Single tap on "Yes"		
Preconditions:	PRE-1: Single tap on "Start", Player reaches game select PRE-2: Player swipes left or right to reach "New" option PRE-3: Single tap on "New", Player reaches confirmation		
Postconditions:	POST-1: System initiates Tutorial interface POST-2: System creates new user game data file		
Normal Flow:	1. User taps "Yes" 2. New user game data file created		
Alternative Flows:	1. User taps "Yes" 2. Previous user game data file deleted 3. New user game data file created		
Exceptions:	1.0 E1 Failed to create user game data file 1. System calls "unable to create new game file" 2. User is taken back to the main menu		
Priority:	High		
Frequency of Use:	Rare		
Business Rules:	None?		
Other Information:	None?		
Assumptions:	None?		

3.2 Menu “Voice” [Item]

ID:	UC-2	Name:	Menu Voice Item
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	None
Description:	User provides an input on a menu item and the name of that menu item is read aloud via text-to-speech facility		
Trigger:	Double tap on [item]		
Preconditions:	PRE-1: Program state: Start Menu interface		
Postconditions:	POST-1: [Item] name voiced to user		
Normal Flow:	1. User double taps [item] 2. [item] name voiced to user		
Alternative Flows:	No alternative flows		
Exceptions:	No exceptions		
Priority:	High		
Frequency of Use:	Fairly often		
Business Rules:	None?		
Other Information:	None?		
Assumptions:	1. [Item] is present on current interface		

3.3 Continue Game

ID:	UC-3	Name:	Continue Game
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	None
Description:	User progresses through a sequence of 3 menu items in order to continue their previously started game. System loads game file data.		

Trigger:	Single tap on “Yes”
Preconditions:	PRE-1: Single tap on “Start”, Player reaches game select PRE-2: Single tap on “Continue”, Player reaches confirmation
Postconditions:	POST-1: System initiates game from last savepoint
Normal Flow:	1. User taps “Yes” 2. System loads game
Alternative Flows:	None
Exceptions:	3.0.E1 Not Loading in save file 1. System calls back “No previous user game file data” 2. User is taken back to main menu 3.0.E2 Player taps No 1. User is taken back to main menu
Priority:	High
Frequency of Use:	Moderate
Business Rules:	None?
Other Information:	None?
Assumptions:	None?

3.4 Echo-locate Feature

ID:	UC-4	Name:	“Echolocate” Feature
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	Developer/ Tester
Description:	It allows the user to identify and locate game objects in the current map tile and current quadrant by giving distinct auditory feedback for currently selected object.		
Trigger:	Player Taps Screen		
Preconditions:	PRE-1: User has game initialized and running.		
Postconditions:	POST-1: Game gives distinct audio feedback		
Normal Flow:	1. User Taps Screen 2. Game creates mockup of orientation, landmarks and distance		

	3. Game uses mockup to play audio
Alternative Flows:	None?
Exceptions:	4.0 E01 Spamming 1. System prevents echolocate until last “tap” has been issued 2. Plays notes of melody per tap E02 Item Exception(item in tile) 1.Do nothing 2.Refer to UC-09
Priority:	High
Frequency of Use:	Fairly Often
Business Rules:	None?
Other Information:	None?
Assumptions:	An object exists to be selected in the current map tile, quadrant

3.5 In Game Options Menu

ID:	UC-05	Name:	In-Game-Options-Me nu
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	None
Description:	Opens an in-game options menu		
Trigger:	Player swipes down.		
Preconditions:	PRE-1: Player is currently in standard game interface		
Postconditions:	POST-1: In-game options menu initiated with [Option 1] presented		
Normal Flow:	1. Player swipes down while in Standard Game Interface 2. Menu name voiced to player 3. Player is able to swipe left/right to iterate through menu options		
Alternative Flows:	No alternative flows		
Exceptions:	No exceptions		
Priority:	High		

Frequency of Use:	Occasionally
Business Rules:	None?
Other Information:	None?
Assumptions:	None?

3.6 Turn Left

ID:	UC-06	Name:	Turn Left
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	None
Description:	Changes the player's orientation left.		
Trigger:	Player swipes left.		
Preconditions:	PRE-1: User has game initialized and running.		
Postconditions:	POST-1: User's orientation on graph moves 90 degrees left.		
Normal Flow:	1. Player swipes left. 2. Players orientation is changed in the direction swiped.		
Alternative Flows:	None		
Exceptions:	None		
Priority:	High		
Frequency of Use:	Fairly Often		
Business Rules:	None?		
Other Information:	None?		
Assumptions:	None?		

3.7 Turn Right

ID	UC-07	Name:	Turn Right
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	None
Description:	Changes the player's orientation right.		
Trigger:	Player swipes right.		
Preconditions:	PRE-1: User has game initialized and running.		
Postconditions:	POST-1: User's orientation on graph moves 90 degrees right.		
Normal Flow:	1. Player swipes right. 2. Players orientation is changed in the direction swiped.		
Alternative Flows:	None		
Exceptions:	None		
Priority:	High		
Frequency of Use:	Fairly Often		
Business Rules:	None?		
Other Information:	None?		
Assumptions:	None?		

3.8 Movement Forward

ID:	UC-08	Name:	Move
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	None
Description:	Player moves into an open space ahead of player.		

Trigger:	Player swipes up.
Preconditions:	PRE-1: User has game initialized and running. PRE-2: User is facing an open space.
Postconditions:	POST-1: User's position moves one on the graph into an empty space. POST-2: Time ticks forward by one. POST-3: Game state progresses.
Normal Flow:	1. Player swipes up. 2. Players position moves forward from orientation in graph.
Alternative Flows:	None
Exceptions:	8.0 E1 Illegal Movement; Wall Exception 1. Player has wall entity in front of orientation. 2. Player does not move. 3. Player receives audio feedback on wall. 4. Multiple movements invoke a notification in audio that the player is indeed attempting to walk into a wall. 8.0 E2 Illegal Movement; Out of Bounds Exception 1. How did the player get here? 2. Restart Map
Priority:	High
Frequency of Use:	Fairly Often
Business Rules:	None?
Other Information:	None?
Assumptions:	None?

3.9 Interact

ID:	UC-09	Name:	Interaction
Created By:	Team	Date Created:	2-11-2019
Primary Actor:	Player	Secondary Actors:	None
Description:	Player interacts with ingame assets.		
Trigger:	Player taps on screen.		

Preconditions:	PRE-1: User has game initialized and running. PRE-2: User is positioned on a tile containing an interactable object PRE-3: User is oriented in the quadrant containing the interactable object
Postconditions:	POST-1: Issue distinct, high quality and realistic auditory feedback to identify object present in quadrant POST-2: if interactable object has compliment, then Issue tactile feedback (unique vibration pattern) POST-3: If object is inventory-applicable, then object is added to player inventory-menu
Normal Flow:	1. Player taps screen. 2. Players interacts with object present in tile quadrant.
Alternative Flows:	None
Exceptions:	8.0 E1 No Item Exception 1.Do nothing. 2.Refer to UC-04
Priority:	High
Frequency of Use:	Moderate
Business Rules:	None?
Other Information:	None?
Assumptions:	None?

4. Data Requirements

4.1 Logical Data Model

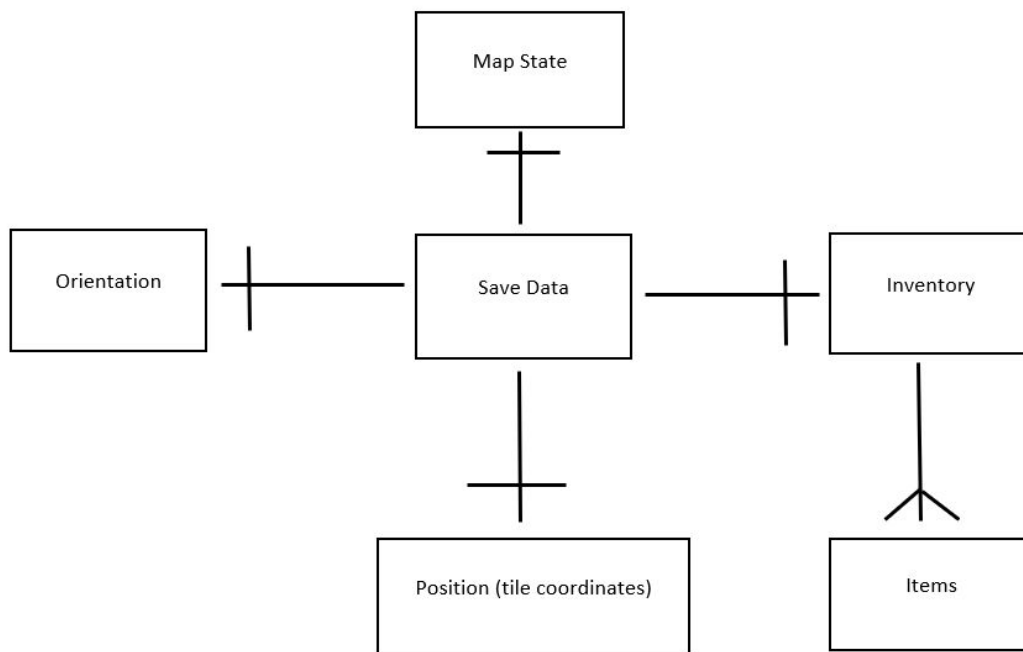


Figure 1: Simplified data model for release 1.0 for ECHO Save Data System

4.2 Data Dictionary

Data Element	Description	Composition or Data Type	Length	Values
Save Data	Stored information about the player's progress throughout the game.	Save Data ID + Map ID + Map Items + Position Tile + Orientation + Quadrant + Inventory Size + Inventory Items		
Save Data ID	Primary key of the Save Data.	Integer	11	

Save Data Name	The name of the save file assigned by the system in the save operation.	Alphabetic	256	
Map State	The status of the map elements, completion of puzzles and other mutable data associated with map tiles.	Map ID + Map Composition + Map Items		
Map ID	A number indicating the current level/ map identity, used to distinguish different maps	Integer	1	[0,9]
Map Composition	A map distinguishing navigable spaces from non-navigable spaces (i.e. walls)	2D Char Array	Varies	
Map Items	A list of items present in the map	Array of Item Names		
Orientation	The last direction the player was facing before the save operation.	Orientation Quadrant		
Orientation Quadrant	Name of map tile quadrant corresponding to most recent player direction	Integer (enumeration)	1	0 (North) 1 (East) 2 (South) 3 (West)
Position	The last tile coordinates of the player before	Position Tile		

	the save operation (with respect to map composition).			
Position Tile	The tile coordinate representing most recent player position	Integer 2-Tuple	2	([0,7] , [0,7])
Inventory	An Inventory is where the items are kept in place for later accessibility.	Inventory Size + Inventory Items		
Inventory Size	The number of items in player inventory	Integer	1	
Inventory Items	List of items in player inventory	Array of Item Names		
Items	Items are what the player is able to access through their inventory.	Item Name + Item Tactile ID + Item Auditory ID + Item Position + Item Orientation + Item State		
Item Name	The name of a specific item.	Alphabetic	256	
Item Tactile ID	An abstract vibration pattern associated with the item, corresponding to an identical pattern indicating its use	TBD		
Item Auditory ID	A concrete, realistic sound/ audio pattern associated with the item,	TBD		

	indicating its nature and use			
Item Position	Map tile coordinate representing the position of an interactable item	Integer 2-Tuple	2	([0,7] , [0,7])
Item Orientation	Map tile quadrant representing more specific position of interactable item	Integer (enumeration)	1	0 (North) 1 (East) 2 (South) 3 (West)
Item State	Value indicating information about the item, such as whether item has spawned or has been added to player inventory	Integer	1	0 (does not yet exist) 1 (exists on map tile) 2 (exists in player inventory)

4.3 Reports

4.3.1 Inventory Overview Report

Report Element	Element Description
Report ID	Echo-RPT-1
Report Title	Inventory
Report Purpose	User wants to see a list of items they can currently use to interact with puzzles.
Decisions Made From This Report	User will be able to use this information to solve puzzles and progress in the game.
Report Users	The player.
Data Sources	Will need to access the active Save Data.
Frequency and Disposition	Report is generated each time the user views the inventory page.

Latency	Complete report should be able to be accessed in less than a second.
Visual Layout	Landscape and Portrait.
Header and Footer	The report header shall contain the name "Inventory".
Report body	Item names and Item descriptions.
End of report indicator	None(repeats list of inventory items).
Interactivity	User will be able to tap on items to have the item name and/or description voiced aloud and receive feedback necessary for the items usage.
Security Access Restrictions	Report shall only be accessible to the player.

4.4 Data Acquisition, Integrity, Retention, and Disposal

DA-1: The system shall load in an existing saved file with the player's current items and location.

DI-1: The system shall update (overwrite) the save file when the player saves once again.

DD-1: The system shall delete the current Save File upon creation of a New Game

6. Quality Attributes

6.1 Usability

User should understand how to interact with all in-game interfaces after engaging with an initial 2-10 minute tutorial level/map, accompanied by a voiceover. This also includes in-game menu swipe interface, in-game options menu, player movement mechanics and all other defined game mechanics.

6.2 Performance

Changes between menu options should take no longer than 1 second. Transitions between main menu to game interface should take no longer than 1 second. Transitions between game levels should take no longer than 5 seconds. Changes in in-game position should take no longer than 200 milliseconds.

6.3 Accessibility

User should be capable of engaging with all interfaces without visual-ability at all times. A user should be able to hone their capability during the tutorial. A user should be able to perform well after the tutorial. Average rate of progression (level completion over minutes of gameplay) should not differ between players along the spectrum of visual ability.

Appendix A: Glossary

TBD: means to be determined.

More TBD