

# SEATTLE TOWERS

Design Document

Version 1.4

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# VERSION HISTORY

Version	Date	Details
0.1	Apr 26, 2016	<ul style="list-style-type: none"> <li>• First version of the document</li> </ul>
0.2	May 1, 2016	<ul style="list-style-type: none"> <li>• Updated formatting, wording, and order</li> <li>• Added game details description</li> <li>• Added audience and market information</li> <li>• Added UI mockup</li> <li>• Added detailed descriptions of the UI elements and patron attributes</li> </ul>
1.0	May 5, 2016	<ul style="list-style-type: none"> <li>• Added member names</li> <li>• Striked out some sections to reduce initial complexity</li> <li>• Elaborated on the game world</li> <li>• Changed camera section to controls</li> <li>• Elaborated on controls section</li> <li>• Changed objects section to rooms &amp; transportation</li> <li>• Elaborated on rooms &amp; transportation</li> <li>• Added graph example in rooms &amp; transportation</li> <li>• Added room and patron interests</li> <li>• Elaborated on music and sound effects section</li> <li>• Elaborated on art section</li> <li>• Changed single player section to progression</li> <li>• Elaboration on progression section</li> <li>• Elaborated on multiplayer-game section</li> <li>• Added more details to resources section</li> <li>• Added whiteboards section in resources</li> <li>• Added character images and reference</li> </ul>
1.1	May 12, 2016	<ul style="list-style-type: none"> <li>• Added interest icons</li> </ul>
1.2	May 19, 2016	<ul style="list-style-type: none"> <li>• Added mouse icons to art section</li> <li>• Added credits for new artist volunteer</li> <li>• Crossed out service elevator</li> <li>• Added another whiteboard image</li> <li>• Minor adjustments to controls</li> <li>• Added more UI sound effects to sound section</li> <li>• Updated rooms and transportation section</li> </ul>
1.3	May 26, 2016	<ul style="list-style-type: none"> <li>• Updated controls section</li> <li>• Updated transportation section</li> <li>• Updated UI section</li> <li>• Updated tutorial section</li> <li>• Added another whiteboard image</li> </ul>
1.4	Jun 8, 2016	<ul style="list-style-type: none"> <li>•</li> </ul>

# GAME OVERVIEW

## Game Logline

A tower construction and management simulator.

## Gameplay Synopsis

Seattle Towers is a tower construction and management simulator set in the heart of Seattle where the player is constructing a multi-purpose tower that hopes to overshadow the iconic space needle in both height and popularity. The game encourages the player to be strategic about the design of each tower due to the focus on room to room interactions that affect popularity and revenue. The player advances by investing into a research tree that unlocks various rooms, or passives, to strategically maximize profits. It is up to the player to decide whether their tower will specialize or diversify.



# GAME DETAILS

## Description

The game is split in two phases: planning, and simulation. During the planning phase, time is paused to allow the player to strategically plan out a tower and changes are only committed when time is resumed. Construction involves building a floor component and a room component. The floor component is just to allow the player to later demolish a room while maintain structural integrity for the rest of the tower. During the simulation phase, patrons are created on the lobby level that randomly decide on a destination that can be routed to via elevator. As the patrons travel through the tower, they will maintain a happiness level dependent on how easy it is to get to their destination to spend money, and how many other places they can visit before the evening when they must route out of the tower.

## Game Genre

Simulator.

## Is this single-player or multiplayer game?

Single player (currently).

## Is this 2D or 3D?

Two-Dimensional.

## Where does the game take place? (World)

Modern Seattle Washington.

## What do I control? How many characters? Can I use vehicles?

The player is the omniscient manager of the tower that interacts through the mouse pointer. There is no character or vehicle the player controls in single-player.

## What is the main focus?

To create an economy simulator that the player can strategically design and manipulate.

## How long does the game last?

The player can continue running the simulator as long as they like, and progress can be resumed where the player last saved. There is no explicit victory condition.

However, should the player's balance go negative, the player must immediately take a loan and repay the loan within one year before the tower is forfeit.

## Comparison

*SimTower (The Tower - 1994)* by Yoot Saito, OpenBook Co., Ltd, and Maxis for Windows, Macintosh System 7, Game Boy Advance, 3DO, Saturn, and PlayStation:

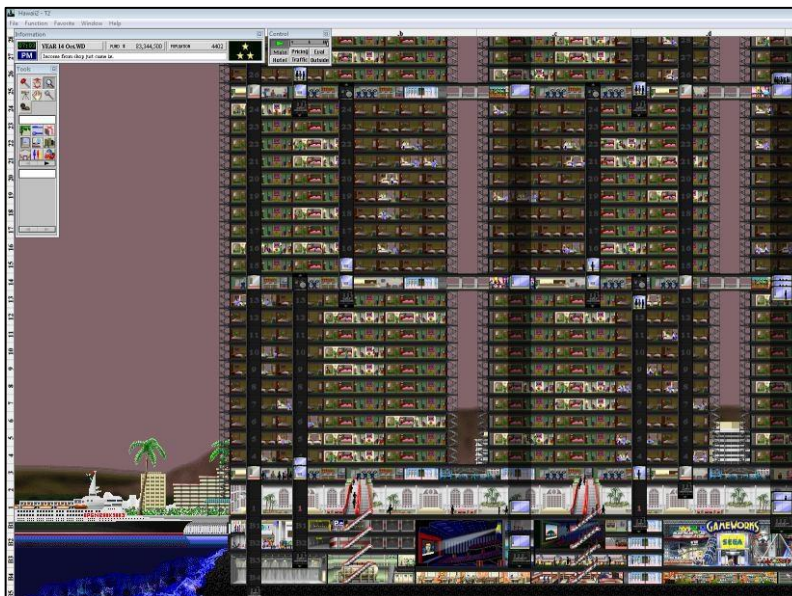


SimTower is considered the original tower building game supporting one scene for a multi-purpose tower with limited height and width constraints. Progression to unlock new rooms, and requirements for the tower, is achieved through reaching a

certain population count and an event where a special VIP visits the tower.

Random events such as a fire or a terrorist threat also occur usually resulting in cutting down the player's savings in lost profits and rebuilding costs.

*Yoot Tower (The Tower II - 1998)* by Yoot Saito, OPeNBook9003, and Sega for Apple Macintosh and Windows 95:



Yoot Tower is the sequel to SimTower retaining most features that SimTower had with a new set of textures, two additional scenes designed to ease the player into the game, and an outside view of the tower. Many translation errors, AI bugs, and other

quirks unbalancing the game were introduced in this version resulting in a poor reception of the game in comparison to the ratings SimTower received. YootTower also added support for plugins to not only reduce the amount of items loaded in to memory, but it also allowed developers to release downloadable content (free) for new maps, rooms, and texture sets.

Fallout Shelter (2015) by Bethesda for iOS and Android using Unity:



Fallout Shelter is a free-to-play game that is focused more on the entities, and their progression, instead of the interaction between rooms. Each survivor has stats that can level up, a health

pool, an outfit, and a weapon. Rooms are used to put the survivors to work to produce resources, or to train them. Survivors can also be sent on missions to earn experience, random loot, and blueprints. The blueprints are used in conjunction with other resources obtained from purchased/earned boxes and the wasteland. Time cannot be sped up, however progress in a room can be fast-forwarded with a percentage chance of failure dependent on the luck of the survivors and the number of times the room has been fast-forwarded recently.

### **What is unique?**

Very few tower management simulator games exist currently, but Seattle Towers will be the first tower management simulator game that will utilize a research tree for the progression in the game. Players will have the option to invest in to various passives, or specific rooms to specialize their tower. The aim of this is to give the game a degree of replayability such that the player will experiment to refine a strategy to succeed in the game.

### **Why create this game?**

Seattle Towers seeks to fill an area in the simulation game market that is not currently saturated while also addressing common complaints in previous tower management simulator games such as poor pathing and shallow economic simulation.



# AUDIENCE, PLATFORM, & MARKET

## Target Audience

There will be no age restriction. The preferred audience are those interested in simulator games or real time strategy games that require continuous interaction, but progress can be saved at any time.

## Platform

Seattle Towers offers a unique simulator experience using a skill tree system for progression, a replayable experience that fosters experimentation through the game mechanics, and later a multiplayer system to allow visiting other towers.

## Top Performers

- Fallout Shelter by Bethesda Softworks
- Tiny Tower by NimbleBit
- Tiny Tower Vegas by NimbleBit

## Feature Comparison

- Seattle Towers will not pursue a free to play model
- Seattle Towers will allow the player to pause and speed up time
- Seattle Towers utilizes research trees allow for upgrading rooms both through passives and through "buff" rooms
- Seattle Towers allows for a much wider and taller tower resulting in complex interactions between rooms that the player must strategically use to their advantage
- Seattle Towers will allow visiting other player's towers to grant research points to both players: The player visiting a tower will get a fixed amount, but the visited tower receives a rating determining a bonus amount of research experience to grant the owner

# GAME WORLD

## Overview

The game world is restricted to a plot of land located in a major city, where the player will be building their tower.

## Key Locations

The gameplay takes place in a major city, nominally Seattle Washington.

## Scale

The game takes place in a single, multistory building of the player's design with a limited base width and height.

## Objects

The player will be able to construct a variety of room to populate their tower, including but not limited to offices, hotel rooms, shops, fast food, restaurants, and apartments. Additionally, transportation objects will allow patrons to travel between floors. See rooms and transportation section for more details.

## Weather

~~Weather and other outside effects can potentially affect the willingness of people to visit the tower and the types of rooms they would desire to visit.~~

## Day and Night

There will be a day and night cycle, with customers entering the building during the day and leaving around nightfall. Residents of the building inversely stay during the night, but may leave during the day for work.

## Time

Time can be paused, played semi-accelerated, ~~and at an accelerated speed to allow simulation of years quickly.~~ Each day/night cycle represents one month, and some transactions occur each quarter (three months, or three day/night cycles).

# GAME CHARACTERS



## Overview

There will be randomized characters in the game as the AI controlled entities, or patrons, that visit and live in the various rooms of the tower.

## Character Creation

Patrons will be dynamically created during the day to simulate people coming in off the street. Additional sources of patrons may be subways, parking lots, etc. Rooms will be the specific controllers that cause entities to spawn and may modify the patron's attributes when they are spawned.

## Patron Attributes

- **Happiness:** Starts at 50% (unless modified otherwise). Happiness will increase when a patron can successfully reach their destination(s). Happiness will decrease when there are delays or other effects. If the patron's happiness reach 0%, they will route out of the tower. This attribute is used to indicate to the player how well their tower is designed.
- **Money:** Starts at a random amount depending on the effects the spawning room has on this entity. When successfully visiting shops, fast food, or restaurants, the money will be transferred to the player. Should the patron's money reach \$0, they will return home (either out of the tower, or to their residence in the tower).
- **Interests:** These interests determine what rooms the patron may visit, and affects the amount of money spent and happiness earned when successfully visiting various rooms.

## Patron Interests

Patrons will have two types of interests when they are created; goods and food. Patrons can visit stores that are not in their interest area, but at a lower chance than stores that are. A patron will be spawned with one of each type of interest with a variable percentage for each.

### *Goods*

- Fashion
- Gadgets
- Entertainment
- Health

### *Cuisine*

- Spicy
- Savory
- Sweet

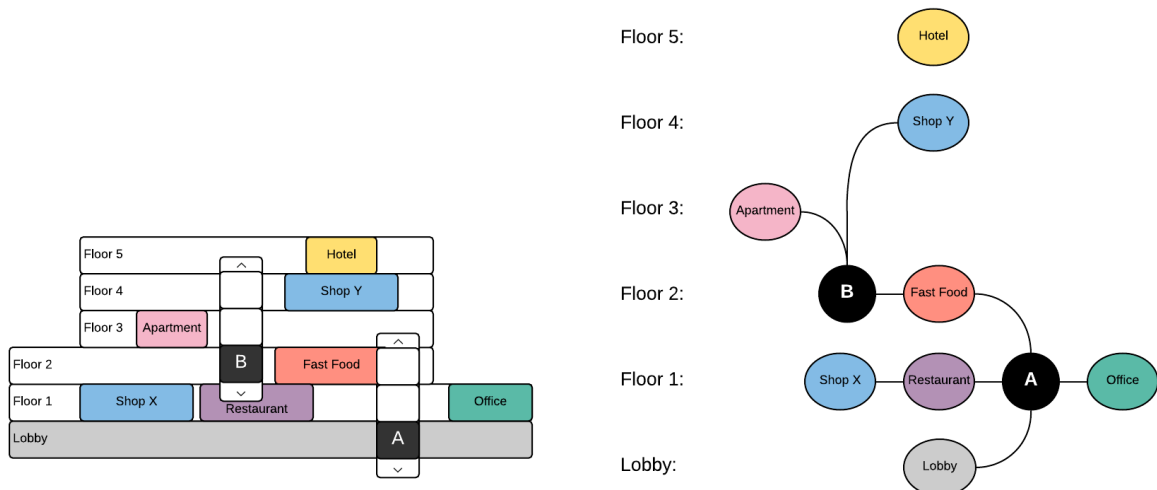
# ROOMS & TRANSPORTATION

## Overview

The tower is constructed as a stack of floors, each containing rooms and are connected by elevators. Structural integrity is maintained through the floor spaces to allow rooms contained within a floor to be destroyed without collapsing the tower.

## Floors

Floors are automatically constructed as the player builds rooms. Floors can only be destroyed when there are no floors above it depending on support. Patrons use floors to walk from room to room. Patron's determine their next destination using a graph like in the example below.



## Transportation

Name	Floor Service	Capacity Limit	Accepted Patrons
<i>Standard Elevator</i>	15 Floors	10 Patrons	All except service
<i>Service Elevator</i>	30 Floors	10 Patrons	Only service
<i>Express Elevator</i>	Unlimited height, 10 floor service	30 Patrons	All except service
<i>Stairs (Slow)</i>	1 Floor	Unlimited	All patrons
<i>Escalator (Fast)</i>	1 Floor	Unlimited	All except service

## Rooms

Seattle Towers will feature different room types including but not limited to offices, hotel rooms, shops, fast food, restaurants, and apartments. These rooms will determine the value of the tower, as well as what the guests will be looking for. Rooms are also broken down in two categories: Leased and Retail. Leased rooms

include offices, hotels, and apartments whereas retail rooms include shops, fast food, and restaurants.

## Leased Room Details

Leased rooms, when built, will not attract patrons to them; instead each day there will be a chance whether the room is rented. For offices and apartments, once rented, the room will remain rented until the happiness of the residents drops below a threshold. For hotel rooms, the resident will only stay one night and leave the following morning. For office rooms, residents will leave each night and then return the following morning. ~~The residents of these rooms may leave the room to go shopping or get food once per day depending on their interests.~~

## Retail Room Details

Retail rooms, when built, attract shoppers to them. Throughout the day, while the room is open, patrons may be spawned that wish to visit this room, spend money, and increase their happiness. Wandering patrons may also visit this room to also spend money and increase happiness. However, each room has a capacity limit and a patron visit duration. Should a patron attempt to visit the room and it is full, they will only deduct happiness and then choose a new destination.

## Room Interests

Retail rooms can sell products in one of two categories: goods or cuisine. Shops have goods, while fast food and restaurants sell cuisine. A room may have one or two associated interests of the appropriate category determined when built, and these interests determine what patrons will likely visit. Each of these flags will have a corresponding symbol and color detailed in the user interface section.

### Goods

Shop	Fashion	Gadget	Entertain	Health	Superstore
<i>Fashion</i>	Boutique	Cell Phones	Art Gallery	Shoes	Department
<i>Gadgets</i>	--	Radio House	Video Games	Bikes	Computer
<i>Entertain</i>	--	--	Books	Dojo	Cinema
<i>Health</i>	--	--	--	Supplements	Gym

### Cuisine

Fast Food	Spicy	Savory	Sweet
<i>Spicy</i>	Mexican	Subs	Thai
<i>Savory</i>	--	Hot Dogs	Cinnaroll
<i>Sweet</i>	--	--	Frozen Yogurt

Restaurant	Spicy	Savory	Sweet
<i>Spicy</i>	Indian	Italian	Sushi
<i>Savory</i>	--	Steak	American
<i>Sweet</i>	--	--	Bakery

## Costs

<b>Transportation</b>	<b>Construction</b>	<b>Maintenance</b>	<b>Addtl. Car Cost</b>
<i>Standard Elevator</i>	\$20,000	\$200 + \$10 per car per quarter	\$1,000
<i>Service Elevator</i>	\$15,000	\$150 + \$10 per car per quarter	\$1,000
<i>Express Elevator</i>	\$100,000	\$1,000 + \$20 per car per quarter	\$2,000
<i>Stairs (Slow)</i>	\$1,000	\$10 per quarter	n/a
<i>Escalator (Fast)</i>	\$5,000	\$50 per quarter	n/a
<i>Floor</i>	\$100 per unit	\$1 per unit per quarter	n/a

<b>Room (Leased)</b>	<b>Construction</b>	<b>Maintenance</b>	<b>Rent</b>	<b>Size</b>
<i>Office</i>	\$100,000	\$1,000 per quarter	\$30,000 per quarter	M
<i>Apartment</i>	\$25,000	\$250 per quarter	\$10,000 per quarter	S
<i>Hotel (Single)</i>	\$50,000	\$500 per quarter	\$5,000 per month	S
<i>Hotel (Double)</i>	\$100,000	\$1,000 per quarter	\$10,000 per month	M
<i>Hotel (Suite)</i>	\$150,000	\$1,500 per quarter	\$20,000 per month	L

<b>Room (Retail)</b>	<b>Construction</b>	<b>Maintenance</b>	<b>Sale Revenue</b>	<b>Size</b>
<i>Shop (10 Capacity)</i>	\$100,000	\$1,000 per quarter	\$-1,000-10,000 per month	M
<i>Fast Food (10 Capacity)</i>	\$100,000	\$1,000 per quarter	\$-1,000-10,000 per month	M
<i>Restaurant (20 Capacity)</i>	\$150,000	\$1,500 per quarter	\$-3,000-30,000 per month	L

# PROGRESSION

## Overview

When starting a new game, the player will start with a fixed amount of starting funds and the game will be initially paused. The player can spend funds three ways: the construction of new rooms or transportation, investment into research points, and payment of maintenance costs. Money can be earned from transactions performed by live buildings with patrons. Maintenance costs are designed to punish the player for poor design.

## Tutorial

- New game prompts: When a new game is started, the UI status message window will be open and will outline the recommended steps for the player.
- ~~Quick start tutorial image when starting a new game.~~
- ~~Tutorial level: This level will feature limited building options and will direct the player through all the UI elements, the procedure for construction, the procedure for deconstruction, and various other tips.~~

## Population Milestones

~~Additional tower requirements will be introduced as a player reaches a population milestone. Upon reaching a milestone, the game will unlock additional rooms for the player to construct and will increase the difficulty.~~

<b>Requirement</b>	<b>Room Unlocks</b>	<b>Additional Changes</b>
<i>100 Population</i>	Restaurants	Increased patron funds, increased patron spawn chance
<i>500 Population</i>	Hotel, Trash Facility	Increased patron funds, increased patron spawn chance, trash requirement
<i>1,000 Population</i>	Parking Lot	Increased patron funds, increased patron spawn chance

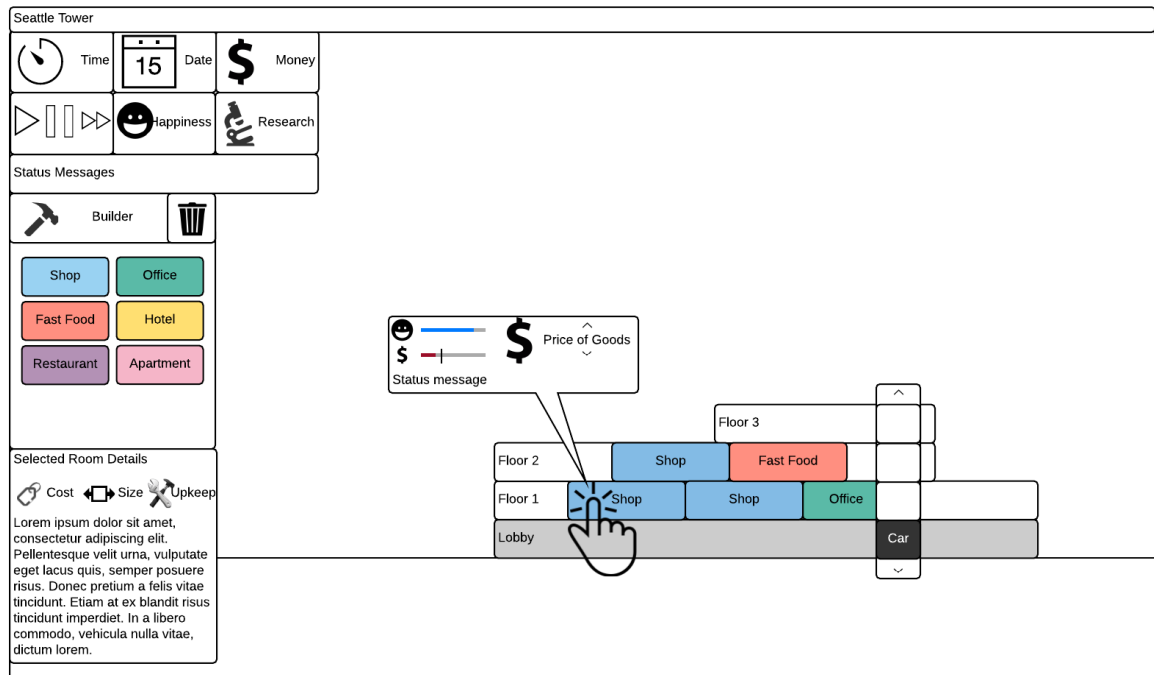
## Research Tree

<b>Unlimited Passives</b>	<b>Bonus</b>	<b>Limited Passives (5x)</b>	<b>Bonus</b>
<i>Shop Revenue (1 Research Point)</i>	1% Increase	<i>Shop Population (5 Research Points)</i>	20% Capacity 10% Popularity
<i>Fast Food Revenue (1 Research Point)</i>	1% Increase	<i>Fast Food Population (5 Research Points)</i>	20% Capacity 10% Popularity
<i>Restaurant Revenue (1 Research Point)</i>	1% Increase	<i>Restaurant Population (5 Research Points)</i>	20% Capacity 10% Popularity
<i>Hotel Revenue (1 Research Point)</i>	1% Increase	<i>Hotel Population &amp; Size (5 Research Points)</i>	10% Popularity +1 Room Type (M and L)
<i>Office Revenue (1 Research Point)</i>	1% Increase		
<i>Apartment Revenue (1 Research Point)</i>	1% Increase		



<b>Buff Room (2x)</b>	<b>Construction</b>	<b>Maintenance</b>	<b>Bonus</b>
<i>Food Court (10 Research Points)</i>	\$1,000,000 (1 per research)	\$5,000 per quarter	Boosts fast food revenue 10% and popularity 20% for any fast food on the same floor.
<i>Event Center (10 Research Points)</i>	\$1,000,000 (1 per research)	\$5,000 per quarter	Boosts hotel revenue 10% and popularity 20% for any hotel rooms 1 transportation away.
<i>Conference Hall (10 Research Points)</i>	\$1,000,000 (1 per research)	\$5,000 per quarter	Boosts office revenue 10% for any offices 1 transportation away.
<i>Grocery Store (10 Research Points)</i>	\$1,000,000 (1 per research)	\$5,000 per quarter	Counts as a shop, earns revenue, boosts apartment revenue 10% for any apartments 1 transportation away.

# USER INTERFACE



## Overview

The UI will be kept close together on the left side of the screen utilizing free horizontal space that a tower will not be using. Each element will be able to be clicked on to view additional details, and specific information for constructed objects can be found by clicking on the object itself. The builder and selected room details panels can be hidden whenever not in use.

## Time

This element will display the current in game time as well as real life time (if in full screen). ~~When this element is clicked on, information about events that happen at specific times will be listed.~~

## Date

~~This element will display the current in game date. When clicked on, it will display the in game calendar specifying what days may have special events.~~

## Money

This element will display the player's current balance. ~~When the game is paused and the player constructs a room, the balance will turn blue and updated. Only when time is resumed will the money actually be committed to the construction~~

~~and no longer refundable. When this element is clicked on, it will display a detailed window of the player's income and deductions for the current quarter.~~

## **Speed**

This element has three buttons: Play, pause, ~~and fast-forward~~. Play returns time to normal speed. ~~Fast-forward accelerates time~~. Pause freezes time and allows the player to plan out construction as detailed above in the money section.

## **Traffic**

This element displays the current average ~~happiness for patrons visiting~~ traffic of the rooms in the tower to give an overall idea how efficient the tower is designed and is reset each quarter. ~~When this element is clicked on, it will break down the happiness calculation per specific patron as well as identify boons or banes to happiness levels that the player should identify.~~

## **Research**

~~This element displays the current amount of research points the player could spend. When this element is clicked on, it will open the research tree which allows the player to specialize into various room upgrades or construction options. This interface will also allow the player to spend funds towards research.~~

## **Status**

This element will periodically message the user with important notifications. When this element is clicked on, it will display a log of all the notifications that have passed for the past quarter.

## **Builder**

This element is by default expanded, ~~but the left hammer icon can be clicked on to toggle the window~~. The trash can icon will toggle the player's mouse into a destruction mode allowing them to destroy rooms, transportation, or floors. The elements in the expanded builder window represent various rooms the players can build. When clicked on, details about the selected room will appear in the details window and it is at this point that the player can click to place the structure in the game world.

## **Room Details**




This element is hidden by default. When a room is selected in the builder window, it displays that room's construction cost, room size, upkeep cost, and description.

## Room Balloon

When a room is hovered over, it will balloon out details of that room including average happiness, current revenue, current capacity, ~~the most recent status message related to this room, and an option for the player to adjust any values applicable to this room such as the price of goods or the cost to rent the room.~~

## Interest Icons

Goods	Symbol	Color	Image
<i>Fashion</i>	Dress	Orange	
<i>Gadgets</i>	Cell Phone	Blue	
<i>Entertainment</i>	Comedy Mask	Purple	
<i>Health</i>	Flexing Arm	Red	

Cuisine	Symbol	Color	Image
<i>Spicy</i>	Pepper	Red	
<i>Savory</i>	Burger	Yellow	
<i>Sweet</i>	Candy	Purple	

# CONTROLS

## Camera

- Panning: W, A, S, D or up, left, down, right arrows.
- Zoom: Scroll wheel.

## Object Building

- Object selection: Click the desired object in the builder UI or press the respective keyboard hotkey associated with the object (displayed to the player as an underlined letter in the builder).
- Construction: Left click (down) in the game world. Construction can be repeated by dragging the mouse in the desired direction (up, left, down, or right). Holding left shift will prevent construction mode from automatically canceling.
- Cancel construction mode: Left click (up) or right click (up) or the ESC key.

## Object Deconstruction

- Mode selection: Click the deconstruction mode icon in the builder UI or press the DEL keyboard hotkey. Will change the mouse pointer.
- Deconstruction: Left click (up) in the game world on an object. If left shift is held, construction will repeat.
- Cancel deconstruction mode: Right click (up), (the ESC key), or click on the deconstruction button again.

## Miscellaneous

- UI interaction: Left click (down).
- Quit and optionally save: Press ESC and confirm dialog.
- Quit: Hold ESC key for 3 seconds.

# MUSIC & SOUND EFFECTS

## Overview

Seattle Towers will include constant background music, voice chatter, sounds for day and night cycles, construction sound effects, transportation sound effects, and UI sound effects.

## Music Tracks

The game will feature a total of three music tracks: A short loop for the main menu and loading transitions, a long loop during regular gameplay, and a long loop during paused gameplay.

## Sound Effects

- ~~UI: Button click sound~~
- ~~UI: Research unlock sound~~
- UI: Money income sound
- UI: Construction sound
- UI: Floor construction sound
- UI: Deconstruction sound
- UI: Status message sound
- UI: Money deduction sound
- ~~UI: Milestone reached sound~~
- Patron: Ambient voice chatter sounds (each patron has a chance to produce one of several sounds, resulting in more voice chatter with more patrons)
- ~~Elevator: Elevator call sound~~
- ~~Fast Food: Occasional ambient sound~~
- ~~Restaurant: Occasional ambient sound~~
- ~~Shop: Occasional ambient sound~~

# ART

## What kind of style will be used in the game?

Cartoon.

## Building Models

- Floor model
- Lobby model
- Room type models
  - Office
  - Hotel
  - Shop
  - Fast Food
  - Restaurant
  - Apartment
  - Stairwell

## Scenery Models

One large background image with transparency so that the background color can be changed as the time shifts from day to night.

## Character Models

Silhouette of people sprite animated to show movement.

## Particle Effects

- ~~Temporary room construction effect (construction when paused)~~
- ~~Room destruction~~
- ~~Research tree upgrade~~
- ~~Milestone reached~~

## UI Icons

- Time
- Date
- Money
- Play/Pause/Fast Forward
- Happiness
- Research
- Deconstruction cursor
- Destruction
- Construction cost
- Room size
- Maintenance cost
- Good/rent price
- Twelve room/interest icons
- ~~Invalid placement cursor~~

# MULTIPLAYER (FUTURE)

## Overview

The multiplayer aspect of this game will be primarily to share your tower design with others. The incentive to visit other random towers will be a reward of research points for the player. Additionally, that player must rate the visited tower so the visited tower will earn additional research points dependent on the rating. If the player chooses a tower to visit (a friend's tower), research points will not be awarded to either party to prevent exploitation.

## Max players

One: Towers are instanced for each player.

## Servers

Amazon Web Services for cloud computing.

## Is the world persistent or not?

The world will not be persistent. Whenever a player visits a tower, the server will retrieve the most recent save of a tower and load that tower in a read only mode for the visitor.



# RESOURCES & LINKS

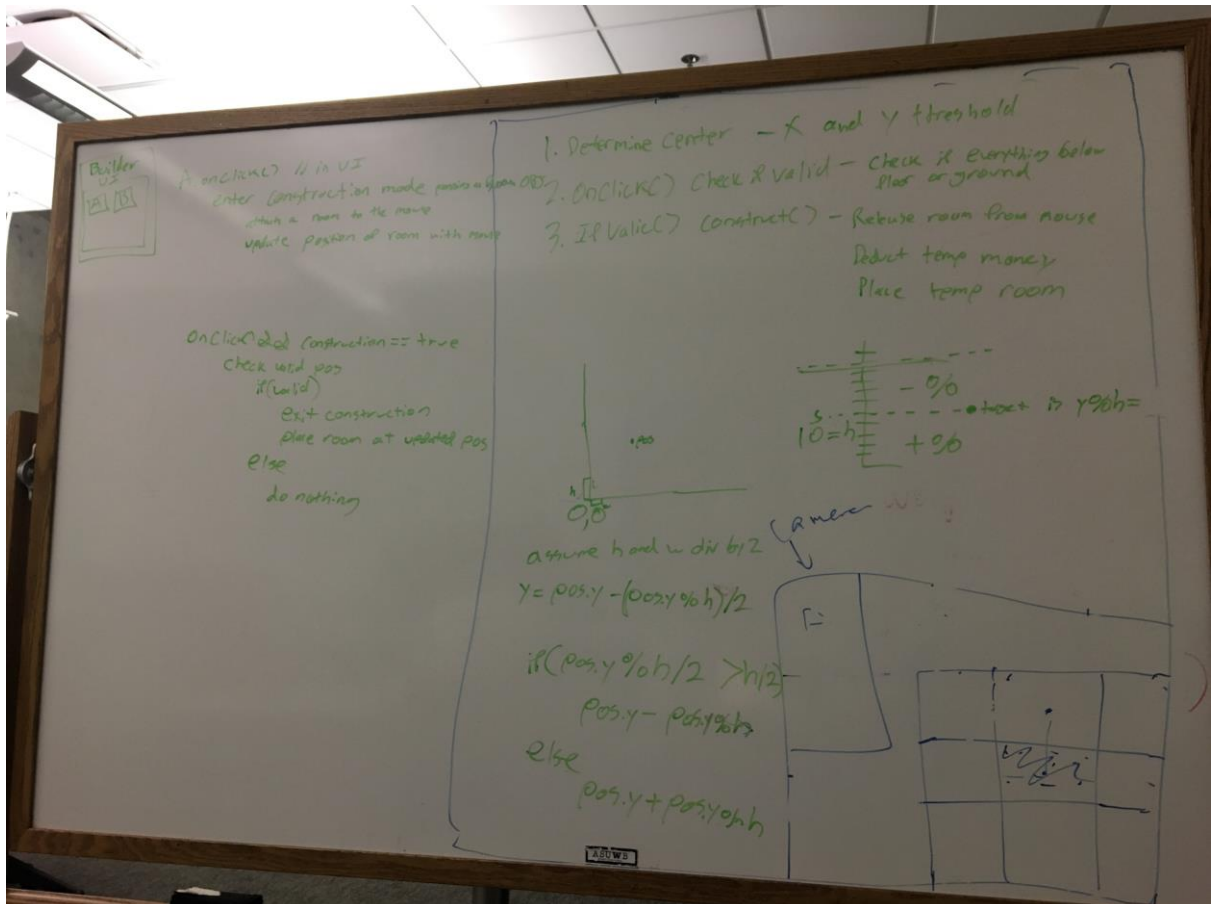
## Credits

- Design documents based on this template:  
<http://forums.xna.com/forums/t/229.aspx>  
<http://indiepath.com/public/designdocumenttemplate01.doc>
- A few sections of the document are based on the design template in this book:  
 Fullerton, Tracy. Game Design Workshop, 2<sup>nd</sup> Edition: Elsevier Inc, 2008.
- Character sprites by Sithjester at <http://untamed.wild-refuge.net/rpgxp.php>
- Interest icons by Harrison McGuire
- Room artwork by Ryu Muthui

## Links to Related Resources

- Wiki on SimTower: <https://en.wikipedia.org/wiki/SimTower>
- Wiki on Yoot Tower: [https://en.wikipedia.org/wiki/Yoot\\_Tower](https://en.wikipedia.org/wiki/Yoot_Tower)
- Wiki on Fallout Shelter: [https://en.wikipedia.org/wiki/Fallout\\_Shelter](https://en.wikipedia.org/wiki/Fallout_Shelter)
- Wiki on Tiny Tower: [https://en.wikipedia.org/wiki/Tiny\\_Tower](https://en.wikipedia.org/wiki/Tiny_Tower)

## Whiteboards



Progression

- Money + room profits - Construction - maintenance - Research
- Population + room popularity - Daily
- Research Points + bought (+ Review from MP) (+ visiting towers)
- Time

Sim

- Happiness
- Money
- Interests

Room

- office
- apartment
- Condo
- hotel

Store

- store
- Restaurant
- fast food

Store tags

- ↑ electronics
- ↓ clothing

Room

- capacity
- cost to build
- virtual popularity
- maintenance
- size
- texture
- happiness

room

- capacity
- maintain
- hap
- cost to build
- size room
- %
- triple
- + generate Person

rented

- virtual popularity
- rent
- rented

store

- good cost
- virtual popularity

Always the store that generates it the random

Research tree

1 | A 2 A  
 2 | L A 2 A > A  
 3  
 4

Passives (unlimited)

- office revenue
- hotel "
- ★ • Shop " + sim money
- fast food "
- ★ • restaurant "
- apartment "

Passives (Limited)

- " Popularity
- " "
- " "
- " "
- " "
- " "

Challenges

- Elevator
- Sim pathing
- U.I / Room shopping

Is Access?

```

+Graph
- BFS
- DFS
- Level data member

+Pathing
- Graph
- Add room (Room, floor)
  . Add node
  . Remove all floor edges
  . Add edges based on pos
- Remove room (Room)

- Add transportation (transportation, s, e) {
  . Add Node
  . Add edge to each floor
- Remove transportation (transportation)

+Patron
- interests array
- Room home = null
- int happiness
- int money

- Room destination
- Node nextDest
    
```

```

+ Elevator
- int capacity - int maxCapacity
- int startFloor;
- int endFloor
- enum state { idle, returning, up, down }
- resize floor (start, end) {
  recreate floor array
  update graph
}

- state currentState
- bool request
- int delay - int maxDelay
- int nextFloor - int currentFloor
- Move Up()
  . currentState = up
  . translate up until next floor
  . if arrived arrive()
  . determine NextFloor()
- Move Down()

- array queuesUp[end-start] // starts at startFloor, ends at endFloor - 1
- array queuesDown[end-start] // starts at startFloor+1, ends at endFloor
- array patrons[capacity]
- enqueueUp (Patron, currentFloor, destFloor)
- enqueueDown (Patron, currentFloor, destFloor) {
  check valid floors
  add to correct queue
}

- struct elevatorPatron
  . patron
  . destFloor

- arrive() // called when idle or end of move up
  drop off all patrons for this floor
  pickup patrons for this floor
  update array
- determine NextFloor()
  find min in patrons
  if up and not full
    check queuesUp from min to min-1
  else if down and not full
    check queuesDown from cur-1 to min+1
    
```

