Design Document for…

**Manifest Destiny**

A RISK based strategy game played in real time.

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Team Members:

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**Game Overview:**

What is Manifest Destiny?

Manifest Destiny is a real-time Risk-based strategy game, where one human player is pitted up against three artificially intelligent opponents. With an income-based model, you the player are given a specified amount of gold pieces every 20-seconds in correlation with the amount of land (barracks) your army possesses. Every barracks represents one additional income. Additionally, for every enemy unit your army deals a killing blow to, you will get some nominal gold amount. This way, we place both incentive on slaying units and destroying barracks; though the ultimate objective is to take control of all barracks.

Units/Structures:

Every country has a barracks, used for troop recruitment; you may pick from up to 4 different unit-types, all with varying costs and benefits. You, as the commander also have the ability to construct defensive upgrades on your army’s barracks’, albeit for a high price.

Races:

There are several difference races to choose from, all with varying models, interfaces, and animations; these races are pitted against each-other in an all-out free for all global conquest. Possible races include Humans, Orcs, Cyborgs, and Undead. Each magi additionally, has a unique particle effect for their specific spell.

Terrain:

Due to severe time constraints, we have only committed to the completion of one map for Manifest Destiny; albeit a diverse map. The schema files are loading are set up to handle many different maps and terrains, but we simply decided to focus on one for the purposes of presentation. Our map is a large island, surrounded by bodies of water. Viewing the contour map, there are various slopes and hills across the entire map. Ground slopes down into the sea, and there are several different splattings across the terrain. These include a rich, dark green grass, a mossy/sand texture, and then several small and distinguishing rock out-croppings. To further add to the diversity, a river runs through the center of the map, which all units can walk through, and their models and selection rings, additionally, will refract across the water. There are twenty barracks scattered across the map, and are randomly distributed between races.

Winning:

End game is determined by total annihilation of all other races, where you are the only remaining team on the map. More simply put, take control of all barracks on the map, thereby disallowing opponents from spawning troops.

Art Assets:

All animated unit models have either been taken from the Ogre database of free models, Psionic’s 3D Model Database (<http://www.psionic3d.co.uk/>), or from Torchlight’s resources. With Runic Games (makers or Torchlight) being so generous, it has given us the possibility of using beautiful art assets with little to no effort on searching for content. Thanks Runic Games!

**Features:**

* One human player and three Artificially Intelligent opponents.
* Overhead, paged camera scheme, controlled by directional arrow-keys (clamped to a static Y-position above the terrain), mouse bounding, and minimap-clicking.
* Several unit-types for each race, with varying benefits and disadvantages in combat.
* Realistic environment, complete with SkyPlane, water, river, Terrain Splatting, and both static/animated fluff.
* Full unit control capabilities, complete with singular unit selection, volume selection, squad movement procedures, and variant stances.
* Full unit flocking and squad formation; separation, cohesion, and avoidance calculations.
* Diverse and challenging AI logic for all three opponents. Attack quickly and rapidly, moving from barracks to barracks, slaying all in their path.
* Barracks tower upgrades, to strategically increase health at crucial times.
* Blood spray upon a unit’s death and spell particles for the magi units.
* Immersive 3D location-based sound effects and music, to help set ambient tones.
* Splash state, menu scheme, credits, and end-game logic.
* Unique user-interfaces for each player and race; every race has a different skin and button scheme for all unit spawns.
* Statistics displayed on the top of the HUD relevant to the player.
* Tool-tips when constructing units.
* Real-time mini-map, clickable and observable to the fullest extent.
* Ambient River running through the center of our island.
* 16 different units models, and 8 varying barracks representations; all animated!
* Fun, addictive game-play that is easy to get caught up in!
* **Gameplay:**

Unit Types:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Unit Type** | **Speed** | **Range** | **Health** | **Damage** | **Price** |
| Brute | Medium speed | Melee only | High | High | 5 gold |
| Scout | Very fast | Melee only | Medium | Low | 3 gold |
| Ranged | Fast | Ranged | Low | Medium | 5 gold |
| Magi | Slow | Ranged | Medium | Extremely High | 30 gold |

Defensive Structures:

Players will also have the ability to construct defensive towers in friendly countries. Though moderately expensive, these towers are a formidable opponent, as they increase barracks’ health from 500 to 750. Building this upgrade costs 7 gold, and has an instantaneous build time. NOTE: These towers must be attached to barracks under your control. Once your barracks is lost, so is the tower, and to attain a new one, you must put out the gold again.

Races:

|  |  |  |
| --- | --- | --- |
| **Race** | **Strengths** | **Weaknesses** |
| Humans | Balanced race | No strong suits |
| Orcs | Extra damage/strength | Slow movement speed |
| Undead | Regenerative health | Low initial health |
| Cyborgs | Increased armor | Slow cool-down on attacks |

Special Units:

Humans: **Grandwizard**

The grandwizard is a wise, sagacious old man, decked in the regal blue and black wizard garb. He floats across the terrain, catching everyone’s eyes just before he casts his fatal spell.

Orcs: **Shaman**

Trained form birth by his orc tribe, the far-seer shaman is decked in elaborate fur robes, a loin cloth, gourds, and shrunken heads; he’s capable of casting powerful spells that spray prismatic particles on enemy units and buildings.

Undead: **Necromancer**

Well-attuned with the living-dead, necromancers may summon unholy souls and cast these out upon unknowing opponents.

Cyborgs: **Terminator**

A mechanized, killing machine, the terminator has incredibly powerful ranged attack. Using mounted pulsar lasers, he can melt enemy units on the spot, with extremely long range and accurate targeting systems.

Terrain:

A map will be divided into several different countries, indicated by barracks (anywhere from 10-40), which will further be divided into regions (5-10). The countries, at the beginning of the game, will randomly be divided across all players in the game (but also spread at an even rate to ensure equality). It will be up to you, the player, on how to decide which countries to attack first. Using your income, build units at specified countries’ barracks, and attack neighboring opponents. For every country you control, you’ll gain one additional income per upkeep round. If an entire region were to come under your army’s control, units will gain some benefit when in the region (such as increased health or damage).

From region to region, terrains will also change. One area may be desert, the other forest, and yet another mountainous. Depending on your race as well, units will have increased or decreased unit speed in their traditional homeland (Undead will be quicker in the bog, yet slower in the sunny, bright desert, etc…).

**Control Scheme:**

Arrow Keys are used to pan the camera across the map, held at a static height above, though you can use the mouse scroll-wheel to come down eye-level with your armies. Additionally, you may push your mouse against the screen boundaries to page across the terrain.

The HUD on the bottom portion of the screen will contain a mini-map, basic unit information, build options for the barracks. You will be able to select spells, positions on the mini-map, and build options for units through this HUD template. On the top dashboard above your game window, vital statistics will be listed such as counts for income, total units, etc… There are drop down options for each opponent, and when clicked on, statistics for their armies will pop up.

Unit selection is done almost entirely with the mouse. Left click to select a unit, right click to move them to a position or attack a unit. You may shift-click to select/deselect additional units, or simply click-and-drag a volume selector to grab multiple units quickly. Press the Escape key to deselect everything quickly.

**Back-End Design/AI Scheme:**

Artificial Intelligence:

For unit movement, we are implementing realistic flocking algorithms to simulate squad movement. Units will be aware of each other, and keep in their own individual unit space when moving and attacking. Units will not collide and certainly not overlap upon reaching their destinations.

For enemy artificial intelligence, it is much more complex scheme. Listed out below is a very basic and high level overview of enemy logic.

If units are land-locked by friendly territories, don’t spawn more units, and if they already exist, move them to a fringe location.

Upon new upkeep, build units at a fringe location, and then move the entire squad to the least-populated, neighboring enemy territory. The attack/dispatch logic which is used for all players (both human and AI) will manage attack logic. AI will also integrate a “clumping” mechanism, where they will slowly commit territory expansion by attacking enemy countries with the highest amount of neighboring allied countries. They will also employ a good blend of unit types, taking advantage of both melee and ranged features; and near end-game, there’s a possibility of summoning magus.

Combat Logic and Simulation:

Whenever an enemy unit comes within specified range, dependent on their attack style, they will engage with enemy units. Each unit will have attack cool downs, and once each is ready, they will either shoot a projectile object (these objects always hit), or swing their melee weapon. When in attack mode, a timer will be set for each unit, and that will determine cool down rates. Upon attack, the opponent’s health will be decremented by the set damage value of your unit.

For special cases, such as the Magi, this will be almost entirely player controlled, and users must manually cast spells. With towers, they will also have splash damage, which will be distributed according to an ordinance radius.

**Future Tasks:**

Expected Completions for Timebox #2:

* Basic camera control setup, using arrows keys and bounding mouse movement.
* Complete unit management control scheme, with left-click select, shift-select, and volume selection.
* Projective decals on the terrain when units are selected.
* Unit movement, complete with basic path-finding and flocking algorithms.
* Basic HUD overlay framework; unit information, build options, and mini-map to be implemented later.
* Polished menu system, splash screens, and non-gameplay logic; ready for final release.
* Generation of some static map fluff, used for theme creation and aesthetic pleasure.
* Framework for the Unit Class hierarchies.
* Grid setup for countries and regions; a shell for the actual RISK logic.
* Setup the control-zones for each country, where whenever a unit enters it, the country falls under their army’s control, logic is updated, and diffuse color changes for the terrain.

Expected Completions for Timebox #3:

The “BUCKEYES” Plan

* **B**asic Pathfinding
* **U**nit Flocking
* **C**ombat (Timers/Animations/etc…)
* **K**nowledgeable AI
* **E**ntertaining Music
* **Y**our mom
* **E**nergizing Atmosphere (Skybox, Static Clutter, maybe Particle Effects?)
* **S**ound effects

Expected Completions for Timebox #4:

* Completed Unit Flocking and Pathfinding
* Knowledgeable AI that can spawn, move, and attack units according to their country boundaries and income
* Import the rest of our needed models
* Implementation of the Magi class
* Beautification of our map
* Polish, polish, polish

Expected Completions for the End of Quarter (on top of previous accomplishments):

* Completed Unit Flocking and Pathfinding; with perfection and avoidance of barracks as well. Prevent or reduce unit “jittering” when attempting to move to certain positions.
* Knowledgeable AI that can spawn, move, and attack units according to their country boundaries and income. But more-so, have previously constructed squads adaptive choose their targets rather than following freshly spawned troops.
* Implementation of the Magi class, and completion of the particle animations for all races.
* Beautification of our map, implementation of things such as a river and more ambient toned art.
* Debugging to ensure consistency. Make absolutely sure the game cannot crash under any circumstances.
* Testing for game play balance. Ensure that the Ai isn’t too hard or easy, and no specific unit (Brutes, Scouts, Ranged, Magi) has too much power over any other unit according to its combat statistics and gold price.
* Final polishing of the HUD for all races.
* Bug repair with left-clicking on the minimap.
* Complete our design-document and presentation-focus material.
* **Unit Hierarchy:**

**Unit Class**

- Protected set of variables, use get /set functions to modify and access.

-Base Move(), Attack() functions. Override these functions in extended classes.

**Ranged Class**

- Override Attack() function, specific for ranged units.

- Set up cool down and unit-specific logic.

**Magi Class**

- Protected set of variables specific to magi.

-Cast() function

-Mana

**Melee Class**

- Override Attack() functions, as this is the same for Brutes and Scouts.

**Scout Class**

-Implement functions specific to Brutes, set attributes, etc…

**Brute Class**

-Implement functions specific to Brutes, set attributes, etc…

**Specific Race Implementations**

- Each race loads their specific animations, spells etc…

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**Third Party Components:**

**OGRE3D** - http://www.ogre3d.org/

**CEGUI** - http://www.cegui.org.uk/

**FMOD** - http://www.fmod.org/

**OpenSteer** - http://opensteer.sourceforge.net/

**Hydrax** - <http://www.ogre3d.org/wiki/index.php/Hydrax>

**Art Assests**

<http://www.cgtextures.com>

<http://homepages.nyu.edu/~ds2465/beginnerheroes.html>

<http://www.the3dstudio.com/>

<http://www.psionic3d.co.uk/>

DerekAudette

http://derekaudette.ottawaarts.com/music.php

SoundJay

www.soundjay.com

Looperman

looperman.com

pir

http://www.partnersinrhyme.com/

freesound

freesound.com

AudioMicro

audiomicro.com

ss

shockwave-sound.com