### Technical Design Document Template

#### 1.0 Revision History

|  |  |
| --- | --- |
| Version | Description |
| 0.1 | add GameManager project and got a (semi)functional button working |
| 0.2 | Added raylib binaries |
| 0.3 | - added buttons to game states  - added pause and play states  - added textures |
| 0.4 | - functional camera  - added nodes  - put in map sprite |
| 0.5 | - added agents and behaviours  - nodes visability is now toggleable with the input 'DBM backspace' |
| 0.6 | - Implemented pathfinding  - release build created |

#### 2.0 Development Environment

**2.1 Game Engine**

Raylib

**2.2 IDE**

Visual Studio 2019

**2.3 Source Control procedures**

Git

**2.4 Third Party Libraries**

Raylib.dll

**2.5 Other Software**

N/A

#### 3.0 Game Overview

**3.1 Technical Goals**

- 2D top-down perspective

- Utilise basic shapes and minor sprite work

- Have an Agent seek to a point

- Have an Agent flee from another agent

- Have an Agent that attacks other agents

- Have agents that harvest resources

- Allow the player to use resources to place down different nodes

**3.2 Game Objects and Logic**

- Helper agent: The player commands these agents to perform specific tasks

\* Harvester agent: This agent is used to seek harvest nodes and collect resources

\* Fighter agent: This agent will fight when other agents get attacked, you can even set paths for them to follow.

\* Builder agent: This agent creates nodes on the players command

- Enemy agent: They attack your Helper agents

- Harvest Node: This holds resources and can be destroyed when nodes are lost, Resources are harvested at a rate.

- Pile Node: Holds resources, resources are picked up instantly to the agents max inventory

**3.3 Game Flow**

You play a tribe trying to survive in a cruel world. You can control/manage the tribe to ensure their survival, by telling the tribespeople to collect resources that are imperative for their survival such as food and water. They can also collect resources which can be used to create huts to live in to keep them cozy, but they will also need them to fend off the monsters that attack in the night. You have to manage your tribe by setting workers to harvest, guard or build in order to survive and beat the game. You lose if your tribe is overrun by the hoard, but if you manage to survive for 7 days, and beat the big boss, you will beat the game. The game is pause-able at any time so you can quit the game when ever you like. (saving option might be available at some point).

Programming stuff to be considered includes:

* Minimising code
* Minimising files size
* Commenting \*
* Optimisation
* Organising code into correct classes

#### 4.0 Mechanics

CORE GAME MECHANICS:

* Recourse harvesting
* Agent control
* Agent autonomy
* Survival
  + HP
  + Thirst
  + Hunger
  + Happiness
  + Temp meter
* Defence
* Hoard combat

<A list of the core game mechanics. I.e., what the player can do and how they achieve this, and what this triggers in the game. For example, shooting enemies is a core mechanic in an FPS>

#### 5.0 Graphics

Top-down 2D, minimal sprite work, quaint simplistic style, lots of colour.

Screen Shots:

#### 6.0 Artificial Intelligence

**Behaviour types:**

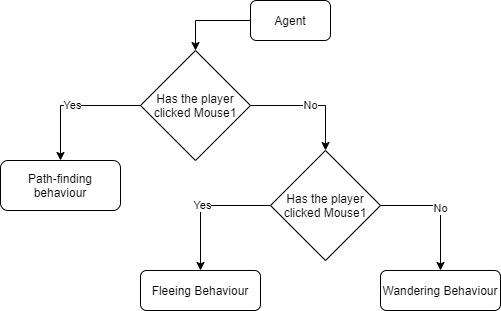
* **Seeking:** The agent has a target (Vector2 {x,y} )and will seek toward it
* **Wandering:** The target has no specific direction and will apply force on itself in random directions. To make this feel natural I use a method revolving around a circle and the applied force needs to exist on the circumference of that circle.
* **Fleeing:** When approached by or approaching a target the agent will run in the exact opposite direction
* **Combat:** When there is enemy agent (agent not belonging to player) present then the player’s agent will remove health points from the enemy agent
* **Harvesting:** When interacting with an object that is harvestable, and the agent has the correct equipment then the agent will remove resources from the node and add it to their inventory. Resources that do not fit will create a pile of that specific resource.

**The Agents:**

Tribespeople:

The Tribes people will have the basic behaviours of:

* Feeing: from enemies
* Wandering: around home base
* Path following: To homes at night





The Harvesters will the addition behaviours:

* Path following: To selected harvest nodes
* Harvesting: Collecting resources from harvest nodes

The Miners will the addition behaviours:

* Path following: To selected harvest nodes
* Harvesting: Collecting resources from harvest nodes



The Warrior will the addition behaviours:

* Path following: To selected enemies
* Patrol: pathing around selected areas



The Builder will the addition behaviours:

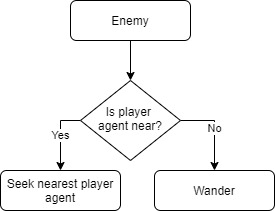
* Path following: To construction sites
* Building: Increased the construction rate of building by flat amount

The Enemy has a different behaviour to the tribesman and behaviour is revolves around sieges. When not sieging:

* Wander: aimlessly
* Pursue: tribesman

When sieging:

* Path: to base
* Pursue: tribesman





The Boss is going to be a variant of enemy that will only spawn on the last day and when it is killed will result in a win. It will only spawn during the siege so its wander behaviour won’t be utilised, but it will have unique pathing and attacking features:

* Pathing: ignores obstacles
* Attacking: does damage in a wide area

<Describe how AI works, i.e. state machine, fuzzy logic, GOAP

(Goal Oriented Action Planning). Describe the various behaviours and how they change behaviour, how do the ‘creatures’ in the game evaluate the world>

#### 7.0 Items/Resources



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Player | Harvest | Attack | Building | Description |
| Default | 1 | 1 | 2 | The humble tribesperson, well rounded. Can, do anything |
| Axe | 5 | 3 | 0 | The Axe wielding tribesman only focuses on harvesting nodes. Their axe gives them a means of self-defence but can’t build. |
| Pickaxe | 5 | 3 | 2 | Pickaxe, Axe same thing. Just don’t get too stoned ;D |
| Sword | 2 | 7 | 0 | The Sword Gives marginally better harvesting and far better attack. Can’t build though |
| Hammer | 2 | 2 | 5 | The hammer Gives an all-around boost to stats but mostly focus on building |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Node | Resources | Storage | Tool | Description |
| Tree | Wood  Food | 20  15 | Axe/Sword  Any | This mighty Oak stands stoic providing the fruits of its labour to hungry travellers and its body to eager builders |
| Rock | Stone  Ore | 25  2 | Pickaxe  Pickaxe | Totally stoned |
| Iron | Ore  Stone | 10  2 | Pickaxe  Pickaxe | Metal Head |
| Bush | Food  Wood | 10  1 | Any  Any | Baby tree |
| Pile | Any | 20 | Any | A node containing any resource |

#### 8.0 Game Flow

**8.1 ‘Mission’ / ‘Level’ structure**

This game only has the single level in it, that level is the great plains of oodle. Oodle is home to many wonderous creatures and resources. The elements that are saved in this level are the Harvest nodes (position, resources types, tool required, sprites and refresh timers), pathing nodes (position, cost to traverse), the players starting point and the siege info which includes the numbers of enemies that spawn over the course of the game and the type of enemies it chooses to spawn.

**8.2 Objectives**

What the player accomplishes in the game:

* Collect resources
* Craft equipment
* Manage tribespeople
* Protects tribespeople from enemies

The players progress is evaluated based on whether they can survive the 7 days. If the player fails, then it will result in a game over but if the player wins then they are given a victory screen.

#### 9.0 Interface

**9.1 Menu**

When the player runs the game they will be treated to a splash screen then to the “Main Menu”. The “Main Menu” has a title of the game as well as the play and exit buttons. The Play button transitions the player to the “Play State” and the Exit button closes the window. When hovered over the buttons colour is inverted.

The “Pause Menu” is accessed by pressing the ‘p’ key on the keyboard while in the “Play State”. In this state the game is un-interactable and all updates on the game are stopped. This “Pause Menu”

**9.2 Camera**

<Describe the camera, how it moves, perspective/orthographic, can it switch? How? Does it need to render-to-texture? does it prevent itself going through walls, use flowcharts to document behaviour>

The camera is a top-down camera. The player can control the camera so it moves up, down, left and right, allowing the player to explore the map as well as the option to follow the tribesman or track the enemy.

**9.3 Controls**

<Keyboard, tablet touch/swipe/tilt, joystick, mouse etc. record double taps, multi touch, use mouse smoothing/ scale mouse for aiming etc.>

The player can control the camera using the arrow-keys

#### 10.0 Asset List

<List all files needed, along with known attributes >

Sprite Work:

#### 11.0 Technical Risks

In this game I want there to be:

* Resource harvesting
* Crafting
* Building
* Agent selecting
* AI Behaviours: (seek, peruse, flee, pathfind)
* Wave system
* Agents have different behaviours at different times
* Agents have different behaviours when equipping different tools