COMP30540 Assignment 1

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Submecha

Submecha is a side shooter stealth game. You play as a submarine with a limited vision circle and enemies lurking in the water around you. You can scan the environment to reveal enemy locations however this also exposes you to them. I changed the artwork to reflect these genre changes. Most of the art was by instagram.com/graphicalpassions and was used with permission.

There are 3 levels of the game to work through each progressing in difficulty. When all enemies are destroyed you progress to the next level. All enemies can be destroyed with one hit however the same goes for the player.

Controls

W	– Pitch up	**D**	– Move forwards
S	– Pitch down	**A**	– Move backwards
LShift	– Ascend	**Space/Click on Screen**	– Fire
Ctrl	– Descend	**Q/Click on Screen**	– Scan

Mechanics & Features

- **Movement**
  I implemented a system that allows the submarine to pitch up and down. Using this the sub can move in diagonal directions and can also aim torpedoes. To achieve this, I added a new point to the game object called "front point". The front point rotates around the centre point of the object and from a combination of the two we can get a vector that represents the object.

  Example of movement: The 'W' key is pressed to pitch up. First, the variable "PlayerAngle" is changed, this is so the Viewer class knows which angle to draw at. We are rotating the front point around the centre point, to do this I worked out the following formula:

  New X = cos(Angle)*(FrontPointX-CentrePointX) – sin(Angle) *(FrontPointY-CentrePointY)
  New Y = sin(Angle)*(FrontPointX-CentrePointX) + cos(Angle) *(FrontPointY-CentrePointY)

  This gets the new position of the front point. Now, to move forward we press "A". A vector is created by subtracting the centre point X, Y from the front point X, Y. A scaled-down version of this vector is then applied to the object to move it in that direction.

- **Firing**
  Torpedoes are fired at the same pitch as the submarine and then follow along the same vector. I implemented a cooldown on the player's shots to incentivise lining up shots correctly.

- **Visibility/Scan**
  Although I limited the visibility of the game to add to the stealth aspect, I added a new scan feature to counteract this. The scan will reveal enemy locations on the map however it also reveals your location similar to a real sonar scan. After a scan, enemies will know your location and be able to fire at you for a short period of time. Visibility is limited in the Viewer class. A black rectangle is created but with a transparent gradient circle at the location of the player.

As this is redrawn every frame when the player moves the gradient circle is moved as well so that we can always see the players sub.

- **Enemy Logic** The enemy's logic is based upon the player's location and if they have been scanned or not. If an enemy is scanned, they will immediately shoot towards the player. There is a random cooldown and there is a chance that they will be able to fire again before they are unscanned.
  To prevent players from abusing the vision cone and just searching for enemies without using the scan enemies will also fire if the player comes within a certain proximity of them. This again reinforces the idea of playing smart and choosing your position before you scan as opposed to a more run and gun style of play.

- **Collisions/Terrain**
  To add some difficulty to the later levels I added in terrain such as rock formations in the level. This can let you hide from enemy torpedoes as they explode upon hitting the rocks but also allows enemies to hide from you. My terrain is made up of a series of bounding rectangles. On each frame, there is a check to see if the bounding box of any torpedo intersects with the terrain.

- **Sound**
  I added sound effects to the game. Namely a looping theme song, torpedo launch sound, explosion sound, and a sonar scan sound. The sounds and music are by Morg soundcloud.com/mr-f-678260121. Used with permission.

- **Levels and End Conditions**
  There are 3 levels to the game with increasing difficulty, level 1 has a single enemy and no terrain. Level 2 and 3 implement more enemies and some terrain. To progress through a level, you must kill all of the enemies. If you survive all 3 levels, you win whereas if you get hit by an enemy torpedo you lose, and the game is over.

- **Controls**
  I added extra controls in the form of mouse listeners. On-screen there is a Scan and a Fire icon, users can click these icons in place of using the keyboard controls.

Known Bugs & Potential Improvements

Due to the bounding boxes not rotating correctly on the players submarine it can become stuck on the terrain sometimes. Some tweaks to the players bounding box would fix this.
End screens can fail load at times. If the game finishes on an incorrect frame then either the death screen or winning screen can fail to load.

Other Artwork References

Underwater Scene - https://www.artstation.com/artwork/Z5w941
Radar Icon - http://getdrawings.com/drawing-tag/radar
Monitor - https://www.dreamstime.com/old-crt-computer-monitor-cutout-screen-isolated-white-vintage-cut-out-background-image143519553
Start text and Fire text - https://cooltext.com/
Main art and sprites - instagram.com/graphicalpassions
Music - soundcloud.com/mr-f-678260121

Screenshots