CSCI 4120 Project Phase 2 Report

Group 11

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Project Title: Project NS

1. Premise of the game
A robot trying to escape from the post-apocalyptic Earth in the year 21XX, involving collecting resources and defeating monsters.

2. Intended audience
Casual gamers

3. Genre
A third-person survival adventure game.

4. Platform
Windows build

5. Build Engine
Unity

6. Goal
The ultimate goal for NS-20 is to collect materials for repairing his spaceship and leave.
During the exploration, NS-20 will encounter monsters and NS-20 needs to collect materials with strategies, like maneuver around enemies or fight against the enemies head on. NS-20 can find a weapon on the map such that NS-20 can inflict greater damage to the enemies. NS-20 can also collect batteries to maintain its battery health. Once NS-20 finds sufficient materials for repairing its spaceship, it can travel to another area for further exploration. There are two areas to be explored: the mutated grassland, and the apocalyptic city.

7. Player input guide

Key	Function
A W S D	Player movement
Z	Pick up / put down items
X	Change weapon
Mouse left/right button	Attack
Esc	Pause
Shift	Walking while focus on front
Space	Jump
Alt	Duck / crouch
Alt + F4	Terminate the game application

8. Final designs

8.1 Characters

NS-20

As shown in the phase 1 report, we initially planned for NS-20 to be a more humanoid robot. While the final version still retains some resemblance of a humanoid, it is more robotic than before. The major reason is that we didn't implement a crafting system that allows NS-20 to craft different items to assist its exploration, which was originally planned but discarded due to time constraints. Thus the accessories for making NS-20 more humanoid (eg. sun hat, shirt) were not added to NS-20.

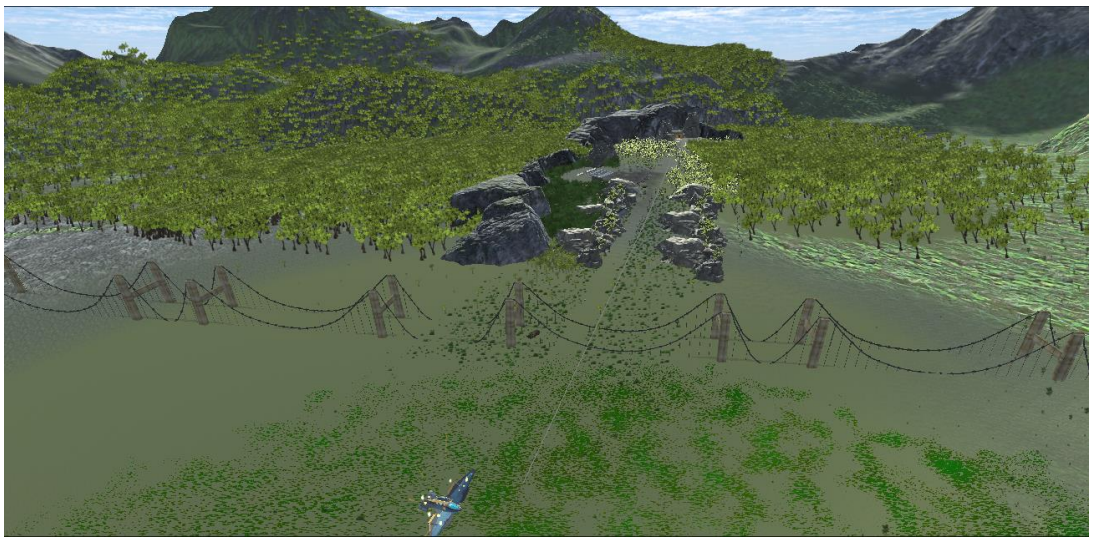
Enemy in grassland

Enemy in apocalyptic city

Boss in apocalyptic city

8.2 Level Maps

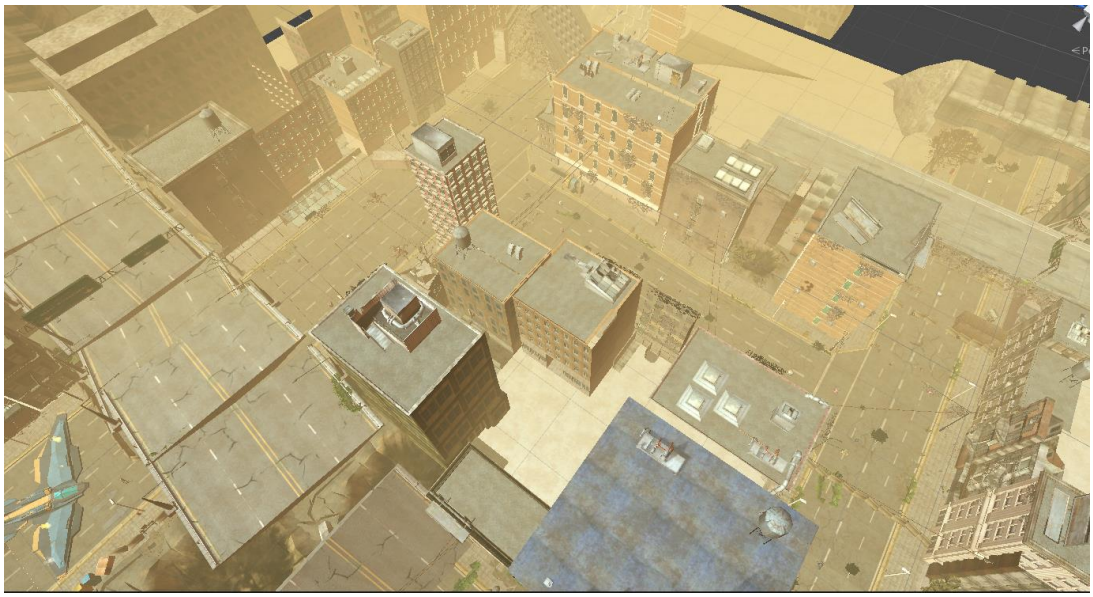
8.2.1 Grassland



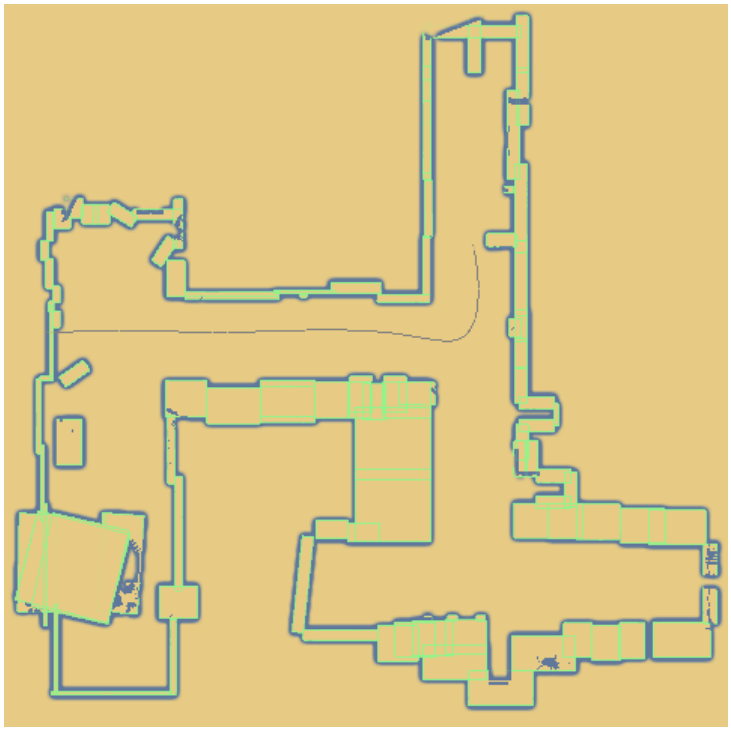
Scenery of grassland

Layout of grassland

8.2.2 Apocalyptic city



Scenery of apocalyptic city



Layout of apocalyptic city

The apocalyptic city level was implemented close to our expectations. However, for the grassland level, we did not include the contaminated water regions as planned due to the time limit. To effectively control the possibility of the player getting out of the intended boundaries, we have added invisible obstacles to the maps. These obstacles form the layout of the maps as shown above. Unfortunately, there was not enough time for us to implement the contaminated water regions, which would appear to be more of a natural boundary instead of the artificial ones. The battery scanner was also not included, as we have changed the set of collectable materials and it is not normal for a battery scanner to be on a grassland.

8.3 UI

Start menu

Pause menu

Top to bottom: Backpack, heath, inventory
Middle: interaction message

As drawn in the project phase 1 report, we considered adding a backpack to NS-20. However, we did not think of the implementation of the inventory system until furt her discussions. The battery was also initially used to repair the spaceship, not to be used for recovering health for the player. Moreover, we originally considere d adding a discharging battery for the player to finish material collection before NS-20 runs out of battery. However, it conflicts with the damage system. Thus the current health system with the battery was used.

8.4 Spaceship

In grassland, highly damaged

In apocalyptic city, less damaged

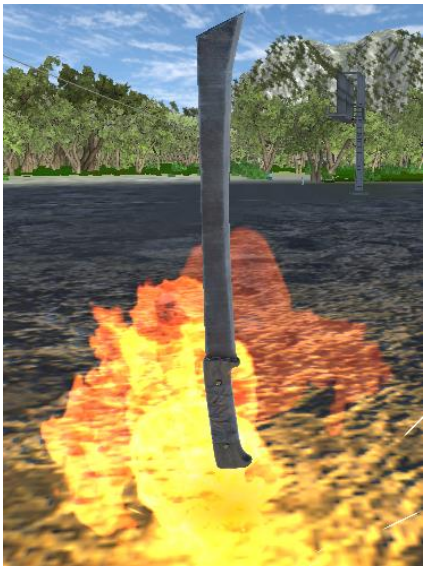
The spaceship is different from our initial design, because we did not have enough time to find two similar assets that can represent our idea of upgrading the space ship. The story plot changed from upgrading the spaceship to gradually repairing t he spaceship. The fire effects were added to represent the level of damage of the spaceship.

8.5 Repairing materials

From left to right: battery, crate, chip, gravity generator

The significant difference between our initial idea to the current set of repairing materials is the variety of collectables. We have considered that only picking up batteries, without an inventory management system, would be dull. Therefore, we changed the battery as a health recovery consumable item for the player, and added three materials, to be managed by the players with 5 slots in their backpack inventory. Allowing medicines also implies careful planning is required in the gameplay. The idea of implementing the battery scanner was also scrapped because it would be more interactive for the players to explore the environment by themselves to find the materials.

8.6 Weapon



Machete

As we have discussed in the game design and also elaborated in the game demo, we still consider the short-ranged weapon and melee attacks are more suitable for our game. Instead of including long-ranged weapons like guns, using melee attacks can greatly increase the interaction between the player and the enemies. The crafting system of weapons was not implemented due to time shortage.

9. Reflection

As this game project is a creative project that was designed by our own, every group member has different ideas upon the implementation. For example, the way we implemented the camera was a result of several discussions. Our original plan was implementing 2.5D, which is a bit different from common games, therefore, there were some misunderstandings. At the end, we compromised and agreed on the camera view that we implemented in the final project.

Also, we have encountered several difficulties during the whole game development project.

Similar to every software development process, our major concern is time management. Since all of us are busy with examinations at the end of the semester, the progress of the project is greatly behind schedule. However, with the hard work over days and nights, we managed to make a prototype of our game. Through setting up internal deadlines and active communications with group members, the project is smoothly completed at the end.

Our project is built using the Unity Engine. The scenes and models are all from the unity assets store as we are not experienced in creating advanced 3D models. The biggest technical issue is that the collider of different objects needs to be added properly, and we have to check carefully the size and shape of the collider of the object itself, between objects, between map and the interactions, the trigger, especially where many conflicts that need to be fixed on character collision with this environment. Improper collider positions will cause the player's abnormal behaviour such as falling through the floor. Therefore, during the stage of debugging, it is required to pay close attention to the colliders.

Another major issue is our familiarity with the Unity cloud collaboration service, which consumed us a lot of extra time. The Unity website is filled with many irrelevant content for us to start the project and produces errors. In the collaboration system, it is required to synchronise the project before publishing some changes to the cloud. As the commit system of Unity is not well-developed for parallel user-friendly collaborations, there is only one working flow, where everyone is required to sync the remote changes before publishing their local changes to the cloud service. When two or more of our group mates were editing the same scene, as the first person published an updated file, the others would be required to synchronise the already published changes before publishing their local changes. The cloud server also would need some time to process the updates and display in the editors of

the others. However, after synchronising the remotes changes, the game may become uncompilable, one of the reasons is that some of the reference files were changed. To handle version conflicts, other group mates usually need to restore from histor y revisions, or directly use the newest remote version of the project, which cause s all the local changes made to be gone. In other words, the others need to re-do the changes again. This system feature brought a lot of inconvenience. Therefore, the local changes need to be published when no one is editing. Although it is not efficient, it still saves others time and effort as no repeated editing will be do ne over again and again.

There are many rooms for us to polish our project, however, due to the time limit, we could not implement the improvements. There could have been more variations of enemies and weapons for the player. The transition animation of flying the spacesh ip from one level to another had been planned but was not implemented. A manually controlled camera could have also been implemented, but we have tried our best to experiment with more on-demand camera angles.

Throughout the whole project, we have explored the Unity Engine and learnt the ess entials of building a basic adventure game. From the lectures and tutorials to the real game, we have put a lot of effort inside and outside the classroom to make it happen. Although the whole process is tough, we enjoyed the first game we created together.

10. Work Distribution

Lam Puy Yin	Unity project setup, level design, character interactio ns & animations, enemy AI, collision detection, invento ry system, health system, combat system, game interfac e, conflict resolution, finding and importing resource s, project submission
Chan Cheuk Hin	Unity account setup, collision detection, character int eractions & animations, level control, enemy AI, game i nterface, debug scripts, testing
Sin Wing Bun	collision detection, camera design and implementation, scene transitions, game interface, testing, assets rese arch
Cheng Ka Pui	level design, finding and importing resources, organise assets, game interface, music and sound effects

11. References

Animation:

https://assetstore.unity.com/packages/3d/animations/rpg-character-mecanim-animation-pack-free-65284

https://www.mixamo.com/#/

https://www.kenney.nl/assets/particle-pack (particle effects)

Textures:

https://assetstore.unity.com/packages/2d/textures-materials/floors/yughues-free-ground-materials-13001

https://assetstore.unity.com/packages/2d/textures-materials/sky/skybox-series-free-103633 (skybox textures)

3D models:

https://www.cgtrader.com/free-3d-models/military/melee/first-person-asset-the-bounty-hunter-machete (sword)

https://assetstore.unity.com/packages/3d/characters/robots/space-robot-kyle-4696 (robot)

https://assetstore.unity.com/packages/3d/environments/sci-fi/polygon-sci-fi-space-low-poly-3d-art-by-synty-138857 (spaceships)

https://assetstore.unity.com/packages/3d/props/exterior/rock-and-boulders-2-6947 (rocks)

free-pack-concrete-block-walls-3d-model/600082 (damaged concrete)

https://www.turbosquid.com/3d-models/free-bridge-games-3d-model/666679 (rusty bridge)

https://assetstore.unity.com/packages/3d/environments/sci-fi/destroyed-city-free-6459 (post-apocalyptic city)

https://sketchfab.com/3d-models/spaceship-2-a02be06221454d3f9a36ef7e0ba5631f

https://sketchfab.com/3d-models/low-poly-spaceships-9177fe4356e4451485dc6129c9904eb9

https://assetstore.unity.com/packages/3d/characters/dynamic-enemy-plants-136355 (enemy plants)

https://assetstore.unity.com/packages/3d/characters/insectoid-crab-monster-lurker-of-the-shores-20-animations-107223 (Crab monster)

Reparing materials

https://assetstore.unity.com/packages/3d/props/electronics/sci-fi-gravity-generator-82847 (gravity generator)

https://assetstore.unity.com/packages/3d/props/electronics/sci-fi-chip-162878 (chip)

https://assetstore.unity.com/packages/3d/props/sci-fi-crate-low-poly-free-urp-173856 (crate)

https://assetstore.unity.com/packages/3d/environments/sci-fi/sci-fi-battery-pack-free-19738 (health item)

Environment:
https://assetstore.unity.com/packages/3d/environments/roadways/windridge-city-132222 (city terrain)
https://assetstore.unity.com/packages/3d/environments/landscapes/realistic-terrain-collection-lite-47726 (grassland and mountain terrain)
https://www.desirefx.me/apocalyptic-city-pack/ (Apocalyptic City Pack)

Music:
It's Okay by Firefl!es https://www.audiolibrary.com.co/firefles/its-okay (background music of Grassland)
Timeless byNeutrin05 https://www.audiolibrary.com.co/neutrin05/timeless (background music of Apocalyptic City)