

Advanced 3D game Development

Assignment 1

Due: Tuesday 5th March 2019, 12 noon.

In your first assignment, you will be combining the skills acquired in the last four weeks to create a game that employs a combination of AI techniques and 3D Animation.

Objective

- Using Unity, create a level that includes the five types described in the next section (either one level with all 5 types or 5 levels with one type each).
- All NPCs have health and the ability to shoot.
- All NPCs are represented by an animated 3D character through Mecanim.
- Animations may apply to each states; for example: walking, running, shooting, dying, or punching and these can be using the FBX animations present on Moodle.
- Use an environment that consists of either an outdoor scene or a combination of basic shapes.

Type 1 (Blue): The Patroller

- Walks on a predefined path using waypoints.
- Follows the player after detecting him/her through sight, hearing or smell or after being hit.
- Shoots at the player while following the player (e.g., every 3 seconds).
- Dies when health is low (≤ 0).
- Does not recharge ammunitions when low.
- Goes back to patrolling after losing sight of the player.

Type 2 (Green): The Intelligent Patroller

- All features found in type 1 except that it walks following random waypoints and follows the player after being attacked by the player.
- Looks for ammunitions when its ammunitions run low (e.g., less than 20%).
- Looks for health packs when its health runs low (e.g., less than 20%).
- Can locate (and go to) health packs (or health zones) and ammunitions based on their positions (i.e., the closest).
- If health is low and no health packs are available, this NPC will try to avoid the player.

Type 3 (Yellow): The Hunter

- Deliberately walks towards the player using Navmesh.
- Uses or avoids specific predefined areas based on costs.
- Shoots at the player while following the player (e.g., every 3 seconds).
- Looks for ammunitions when its ammunitions run low (e.g., less than 20%).

- Looks for health packs when its health runs low (e.g., less than 20%).
- Can locate (and go to) health packs (or health zones) and ammunitions based on their positions.
- If health is low and no health packs are available but ammos are high, this NPC will keep chasing the player until new ammos become available.

Type 4 (Red): The Sniper

- Always tries to run/walk away from the player.
- Will ambush the player when the latter enters a specific zone with a trigger (e.g., it will go to the ambush site and throw a grenade towards the player). This behaviour should use a sub-state machine and a Behaviour script.
- Looks for health packs when its health runs low (e.g., less than 20%).
- Can locate (and go to) health packs (or health zones) and ammunitions based on their positions.

Type 5 (Orange): The Team

- The player leads a team of 4-5 team mates.
- The team members follow the leader, and stop when within 2 meter.
- The player can order its team members to attack specific NPCs (one-to-one to several-to-one).
- The attacks from the team members consist of punches (i.e., close range).
- The player can order its team members to withdraw from an attack.
- After withdrawing from an attack, the team members will follow the leader.

Type 5 (Purple): The Mob

- Includes a leader (NPC) and its team mates (4 or more)
- The leader will patrol the scene using waypoints.
- The team members follow the leader, and stop when within 2 meter.
- The leader will order its team members to attack the player when the latter is detected by the leader through sight or hearing.
- The attacks from the team members consist of punches (i.e., close range).
- The leader will order its team members to withdraw from the attack when one of the team member has been eliminated.
- After withdrawing from an attack, the leader will resume the patrol.
- The team members and the leader can be hit by the player.
- The leader can be hit.
- If the leader dies, its team members will scatter and walk aimlessly.

For this level:

- Health packs are spawn frequently depending on whether health packs are already available.
- The player will need to collect 10 items before the time is up (3 minutes).
- The player avails of a gun and health.
- The player will be able to replenish its health levels and ammunitions by collecting ammunition and health packs.
- When an NPC collides with the player, the current level is restarted.
- The environment needs to include platforms (for the use of off-mesh links), different areas (each with an associated cost), and obstacles.
- All NPCs need to use an FSM.
- For each NPC, use a colored sphere placed above the NPC that can be seen from the y-axis.
- The player wins when s/he has collected all the items within the time limit without being caught by the NPCs.

Marking:

- <40% (fail) No NPCs were implemented
- 40%: Types 1 is fully implemented.
- 40-45%: Types 2 is fully implemented.
- 46-50%: Types 3 is fully implemented.
- 51-65%: Types 4 is fully implemented.
- 66-70%: Types 5 is fully implemented.
- 71-75%: All the above + new NPCs of random types are instantiated at an increasing frequency.
- 76-80%: A third-person view is used with a 3D character animated through a 1D blend tree.
- 81-86%: A third-person view is used with a 3D character animated through a 2D blend tree.
- 87-90: Some of the NPCs are using an Animator Controller Override.
- 91-95%: All the above + code is indented and commented in parts + clear interface.
- 96-100%: All the above + screen cast and list of features implemented were provided.

Delivery:

- List of the features that you have implemented and where (file name and method, if/where applicable).
- Full project zipped.
- A screen-cast (link to be provided).
- A WebGL version.