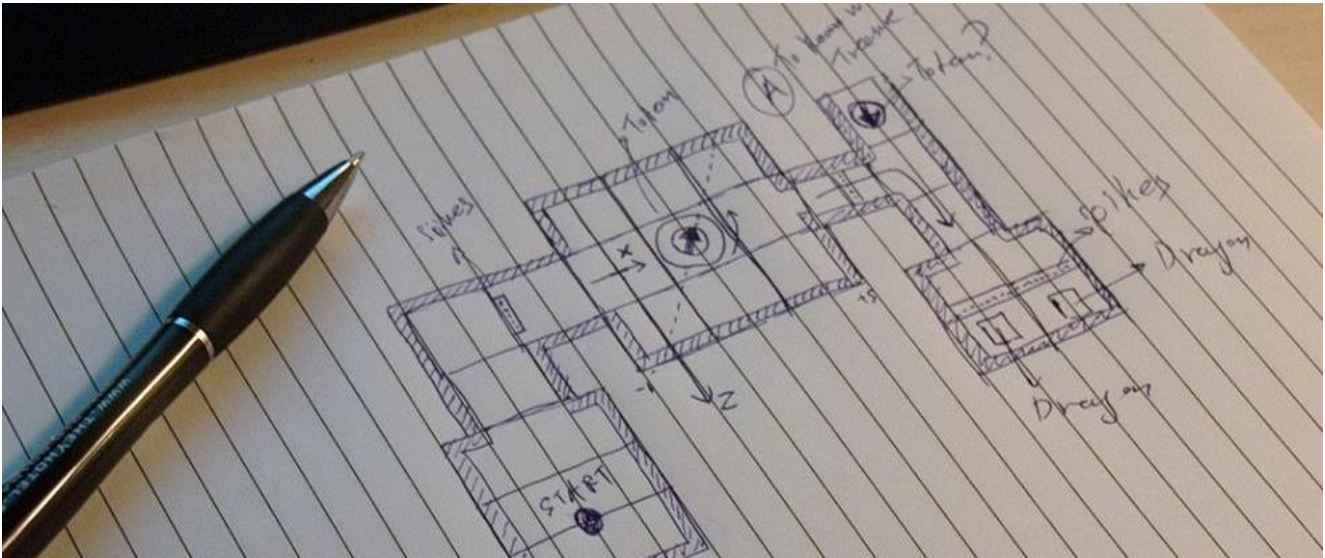# Computer Graphics Final Assignment
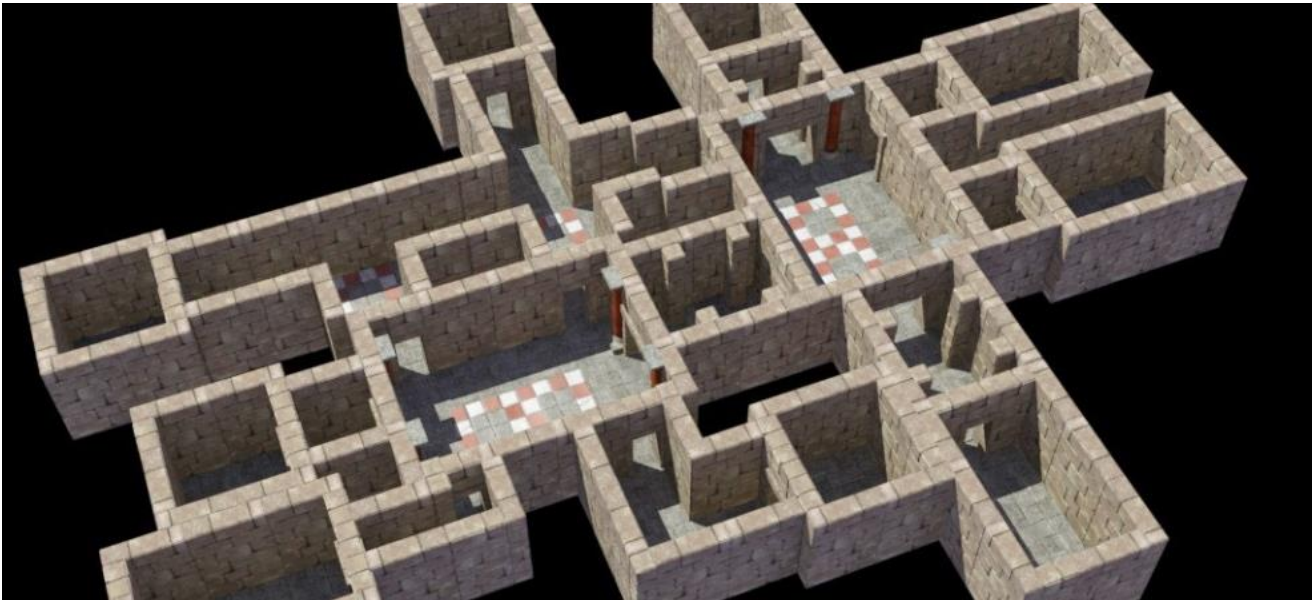*2024-25*

Dungeon Masters – Build you own dungeon crawler game

1. Conceptualize and design your own dungeon

2. Build the dungeon geometry

3. Add deadly traps and power-ups

4. Implement avatar control and navigation

5. Collect all trophies to win the game

Part A – Assignment description

Create an interactive dungeon crawler game in Unity, in which the user guides a hero through an enclosed maze-like environment (the dungeon) with the goal to locate and collect all scattered treasures, while avoiding deadly traps.

The 3D environment can be built as a flat space of interconnected rooms and corridors, using the 3D models and model aggregations provided. The user controls the avatar of the hero (which can be animated, in response to the actions it is performing) using an input modality of your choice (platform-dependent). In the simplest implementation, the hero movement is restricted on the horizontal plane of the two-dimensional maze. However, you can optionally compose more elaborate, multi-level/floor dungeons, where the hero climbs stairs or moves up or down ramps to reach the individual sub-spaces. The camera should automatically adapt to the hero's position, banking to follow his/her trajectory. Alternatively, a manual control of the camera can be established.

The currently active dungeon is completed when all treasures are recovered by moving the hero in contact with each one of them. It is advised that treasures are guarded by traps, to make the experience more engaging. Each trap can reduce the "life" of the hero by some amount and the game ends when the life of the hero goes to zero.

1. Requirements

Assignment grading corresponds to the fulfillment of the following requirements:

Requirement	Description	Marks
Static scene composition	Build the dungeon by hierarchically combining geometric building blocks (see provided content) using transformations. Build your own prefabs and object clusters but avoid providing dungeon environments in the form of single objects (e.g. externally modelled or downloaded), as these will hinder rendering. The scene game objects may include reactive or dynamic elements (opening doors, particle systems, pools of water, animated objects, etc.) The dungeon must include at least 4 discrete rooms, 2 treasures and 2 traps.	1.0
Character and camera control	Implement a hero avatar navigation mechanism and an attached camera model to follow the avatar. Camera can have a variable zoom level (distance to the hero) and "lazy" tracking. You can use either the legacy Input class or the new abstracted input system of Unity for controller input.	0.5
Lighting	Include appropriate light sources throughout the scene of a dungeon to provide amble lighting for the navigation and spotting of traps. Avoid flooding the scene with light as this will drastically diminish the quality of lighting. Avoid using "hovering" lights over the hero. Use a carried torch or flashlight (depending on theme) for that purpose, if required. Add light and reflection probes and bake illumination on lightmaps,	0.5

	for indirect lighting and reflections.	
	Determine where and when to use shadows for the light sources, as they impact performance. Consider baking direct lighting for non-movable sources that only contribute to ambience.	
Interactive elements	The hero avatar must interact with a) the treasures and b) the traps and their components.	1.3
	Upon collision with a treasure, the treasure is removed from the dungeon and the score is incremented. The level is complete when all treasures are recovered.	
	Traps can be anything from chasms and deadly contact surfaces (e.g. acid) to rotating and protruding spike traps or projectiles spawned from stationary or moving positions in the environment. Determine which parts are reducing life from the hero and perform the necessary updates upon collision with them.	
	Provide all necessary lifecycle of the trap elements, including their animation, spawning and deletion, as well as collision detection.	
Collision detection and navigation	For a flat dungeon, the hero movement is constrained by the spatial limits of walls and other obstacles. In addition, if vertical movement is supported, provide all necessary collision and physics to support proper interaction with the environment (e.g. can the hero jump over an obstacle or from a raised platform?).	0.7
	Build a NavMesh (see Unity documentation) for navigation of complex dungeon scenery, if required.	
	Total:	4.0

Additional functionality:		
Multilevel dungeon design	Non-flat arrangement of the dungeon. Access via elevators, ramps and stairs (implemented as ramps for navigation and collision purposes).	0.7
Responsive / animated components	Elements of the environment (including dynamic lighting) could be responsive to triggered actions (switches, pressure plates, proximity, etc.)	0.3
	Total:	1.0

2. Assets

You are provided with a basic set of assets that can be used as building blocks to compose a phantasy-themed basic level, as shown in the example images. These are compiled into Unity Prefabs and are available for import from the Unity package at:

https://cloud.aueb.gr/index.php/s/MjPKzLiPM6jkEzj

Apart from the prebuilt prefabs, you can also combine elementary models and materials that the prefabs depend on to create your own prefabs.

Obviously, you can import your own created or download assets (you will need to do so for the hero model, anyway). Furthermore, you can change the theme entirely and go for a playful or futuristic style for the dungeon.

When importing your own textures, make sure to read the Unity albedo, normal and mask map specification first so that information is correctly mapped to the appropriate channels of the texture files. You can also find Unity-ready assets in the Unity asset store and other repositories.

3. Work groups and evaluation

You can deliver the assignment either alone or in groups of up to 3 students. The assignments will be evaluated and demonstrated after the end of the examination period. ERASMUS students, who need to depart sooner for their countries of origin, are asked to contact the instructor at gepap@aueb.gr to set an earlier date and time for the examination.