2024 / 25

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Module Descriptor

Introduction to 3D Game Development (Computing and Mathematics)

Introduction to 3D Game Development (A10865)

Short Title: Intro to 3D Game Development
Department: Computing and Mathematics
Credits: 5 **Level:** Introductory

Description of Module / Aims

This module will provide the students with the necessary skill set to develop a 3D game using the Unity Game Engine. It focuses on a high-level approach and the use of 3D game engines to create video games that implement some of the basic features found in commercial video games (e.g., collision detection, 3D navigation, 3D views, and basic artificial intelligence).

Programmes

		stage/semester/status
COMP-0647	BSc (Hons) in Applied Computing (WD_KACCM_B)	2 / 4 / E
COMP-0647	BSc (Hons) in Applied Computing (WD_KCOMP_B)	2 / 4 / E
COMP-0647	BSc (Hons) in Computer Science (WD_KCMSC_B)	2 / 4 / E

Indicative Content

- Collision detection
- Navigation
- Environment creation
- Javascript coding
- Object instantiation
- Artificial intelligence
- Rigid bodies
- Assets creation and management
- 3D animation
- User interface

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Code a 3-Dimensional game with the Unity engine with a corresponding GUI.
2. Code game mechanics using Javascript.
3. Employ both bespoke assets (audio, textures, 3D objects), and built-in assets (audio, textures, 3D objects), to create indoors and outdoors environments.
4. Code and use navigation (first- and third-person controllers), collision detection, and cameras (e.g., view ports, multiple cameras, layers, etc.).
5. Use rigid-bodies, particles effects, and manage 3D animations for improved realism.
6. Employ and manage NPCs (e.g, AI, Finite-State Machines and navigation).

Learning and Teaching Methods

- Since this module is focused on developing practical programming skills (i.e., game programming for mobile devices), the four contact hours will be delivered in the computer labs in the form of two 2-hour practicals.
- Due to the very practical nature of the skills to be acquired in this module, these practical sessions will be centred around the idea of learning by doing, whereby students develop proficiency in the specified skill set through guided activities, and whereby lecturers provide short formal presentations of relevant concepts and technologies, as well as practical tips, feedback, and best practices.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Practical	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	25%	1,5,6
Assignment	25%	1,2,3,4
In-Class Assignment	50%	2

Assessment Criteria

<40%: Inability to understand, explain the workings of or modify, a simple program. Inability to write simple programs using constructs as per learning outcome (3). Inability to use the programming environment to edit, run and debug programs.

40%–49%: Able to understand, explain the workings of or modify a simple program. Able to write simple programs using constructs and data structures as per learning outcome (3). Able to use the programming environment to edit, run and debug programs comfortably. Can produce a prototype of a simple system.

50%–59%: All the above and in addition correctly choose appropriate programming and data structures. Use pre-defined class libraries in programs (e.g. String). Show a high level of competency with programming environment.

60%–69%: In addition, able to apply given solutions to new, similar problems. Starts to reference on-line documentation to examine new constructs, libraries. Starts to see programs in terms of system of components.

70%–100%: All previous to an excellent level. Starts to understand the concept of good solutions.

Supplementary Material(s)

- Blackman, S. and J. Wang. *Unity for Absolute Beginners*. NY: Apress, 2014.

Requested Resources

- Equipment: MAC PCs
- Room Type: Computer Lab