Information on Final Examination

CMSC5716

Web Based Graphics and Virtual Reality Systems

Final Examination

- Duration : 2 hours
- 7:30 pm – 9:30 pm
- CYT 201 (Cheng Yu Tung Bldg 201) (CUHK Campus)
- You can bring with you
  - One A4 cheat sheet
  - Calculator

Questions

- Part I (60%)

  Compulsory Questions

  Q1 –Q4 with sub questions

- Part II (40%)

  Choose TWO out of Three Questions

  Q5 –Q7 with sub questions

PART I

Topics includes

- Matrix and Vectors (i.e. Lec 1 & 2)
- Spaces and Camera
- Lighting Model and Shading
- Transparency
- Texture Mapping and Sampling
- Virtual Reality and Augmented Reality

PART I

- Q1 [10 marks] Concepts in L1-L10
- Q2 [30 marks] Maths in L1-L2
- Q3 [15 marks] Maths + Concepts in L3
- Q4 [15 marks] Concepts + Maths in L4-L5

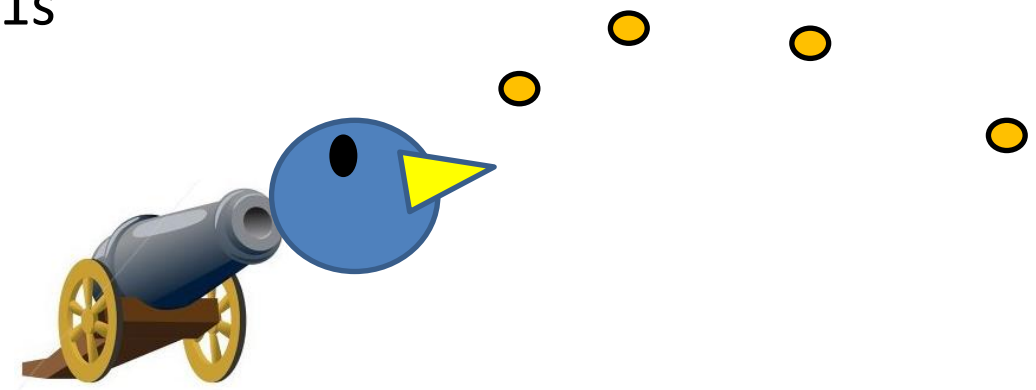
PART II

- Topics include

1. Rendering Pipeline and Particle System
2. Spline Interpolation and Animation
3. VR, AR, Ray-tracing, Global Illumination and Radiosity

Some Sample Questions (Particle System)

- A game company is developing a 2D game called “Happy bird” in which a circle shape bird will be shot out and move based on physics.
  - A) A programmer of this company suggests to use Beizer curve to compute the movement / trajectory of the bird when shot. Do you think this fulfill the requirement of physically correct ?
  - B) If the initial position and velocity of the bird at time t =0 are <0,0> and <1, 2> m/s respectively, and it is subjected to an external gravitational force f = <0.0, -10.0>N, compute the trajectory of the bird at t=1 and t=2 if dt = 0.1s



Some Sample Questions(VR and AR)

- A museum in HK is proposing to develop a portable VR navigation system for their museum, so as to attract overseas users during exhibitions
  A) Suggest necessary devices for developing a portable VR navigation system and the advantages of using these devices.
  B) The staff of museum mentioned that an old head mount display which is a non-see through, do you suggest to reuse the HMD for the VR navigation system? Why?

Some Sample Questions

- Rendering Pipeline and Shader
- ABC Toy company is trying to upgrade its Kiosk with 3D user interface. The software engineer suggests to use GPU for fast rendering.
  A) Why a GPU can accelerate better the rendering process but not a CPU ?
  B) The software engineer would like to display their 3D toy products with cartoon style as shown below. Will you suggest him to use texture mapping to achieve the effect ? Or there any better solution?