香　港　中　文　大　學
The Chinese University of Hong Kong

二零一二至一三年度下學期科目考試
Course Examination 2nd Term, 2012 – 2013

科目編號及名稱
Course Code & Title :　CSCI 4120 Principle of Computer Game Software
時間　　　　　　　　　　　　　小時　　　　　　　　分鐘
Time allowed　　：　　2　　hours　　　　　　　minutes
學號　　　　　　　　　　　　　座號
Student I.D. No.　　：　　　　　　　　　　Seat No. :　　　　　　

TOTAL: 100
ANSWER ALL QUESTIONS

(1) (a) Jack is planning to start up a game company by himself. The company has very limited funding resource and manpower (1 person). And he is trying to develop a tetris-like game in a quite formal way, e.g. writing multiple detail documents on high concept, game treatment and followed by game script. Do you think it is a good way to do it? Justify your answer. **(5 marks)**

(b) Why many action adventure games are not developed in sandbox (non-linear) manner? **(4 marks)**

(c) Is it a good idea to develop a flight simulator using 2D side view perspective? Justify your answer. **(4 marks)**

(d) Steve's game company is developing a network game that allows multiple players to link together. He plans to invest 50% of his manpower on the artificial intelligence of the monsters inside the game. Do you think it is worthy? Justify your answer. **(6 marks)**

(e) Suppose you want to protect your game against the piracy. Suggest two ways to do it. **(6 marks)**

(2) (a) Suppose you are giving the choice of utilizing Wii remote and joy pad to realize a tennis game. Which hardware interface will you choose? Why? **(4 marks)**

(b) Why many games nowadays adopt thirty-party game engines instead of their own rendering module in the development of their games? **(4 marks)**

(c) During the rendering, triangles have to go through multiple logical spaces in order to be projected onto the 2D screen. Which particular space is the best for clipping (removing out-of-view triangles)? Why? **(4 marks)**

(d) Depth sorting can be used to remove hidden triangle during rendering. But it almost has no practical usage in nowadays graphics pipeline. Why it fails? **(4 marks)**

(e) In 90's it is very difficult to produce cartoon style rendering of game characters. Such cartoon style is especially needed if the game title is based on TV/movie animation series. The situation was changed after 2000 and more games can be released in

cartoon style. What has been changed after 2000? Why such change eases the cartoon style rendering? **(4 marks)**

    (f)   Lighting is one of most challenging problem for real-time realistic games. How existing game developers work around it? **(5 marks)**

(3) (a)   Binary space partitioning (BSP) is a method for recursively subdividing a space into convex sets by hyper-planes. Convert a list of lines (A, B, C, and D) as shown in the following figure into a BSP tree in steps, and at each step indicate clearly the selected hyper-plane and its front facing direction. **(12 marks)**
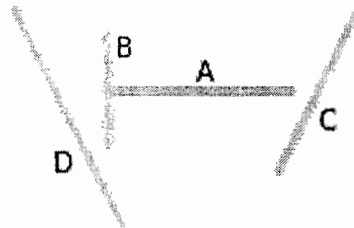

(b) List two advantages of using BSP in visibility processing? **(4 marks)**

(c) List two common data structures used in terrain rendering? **(4 marks)**

(4) (a) Given a plane [0, 0, 1, -9] (which describes a plane where $z = 9$) and a ray with an origin of [2, 3, 4] and a direction of [1, 1, 1], find the intersection between the ray and the plane. **(5 marks)**

(b) Given any four 3D points that are not coplanar (i.e. the four points are not in the same plane), we can form a tetrahedron (as shown in figure). If you are given another 3D point, design a simple algorithm to test whether the given fifth point is within the tetrahedron formed by the first four points or not. **(5 marks)**
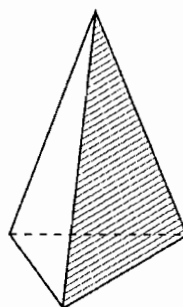
(5) (a) Boids algorithm is an artificial life program which simulates the flocking behaviour of birds. What are the three basic rules applied in the simplest Boids world? List two additional complex rules that can be added. **(5 marks)**

(b) Briefly describe what is an influence map and list three of its applications in game AI. **(5 marks)**

(6) **(a)** Describe one common way to cheat in online gaming. **(3 marks)**

(b) Describe one countermeasure to combat with the above-mentioned cheating in (a)   **(3 marks)**

(c) List two categorizations of scripting. **(4 marks)**

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