Department of Computing

ISCG6442—Game Programming
Assignment 3: Take Home Test

Total marks: 100
Course Weighting: 20%

Due Date: End of semester

Test Questions:

Section 1—C++ [20 Marks]

1. Develop C++ code to illustrate the difference between reference and pointer variables.
[5 Marks]

2. Write a C++ program to illustrate the pitfalls of dangling pointers using both stack and heap based allocation.
[5 Marks]

3. Write a C++ program to calculate the average of 10 numbers using arrays, the stack, and heap allocation.
[5 Marks]

4. Write an SFML program to draw a 64 x 64 grid of cells using the SFML line primitives.
[5 Marks]

Section 2—Game Phsyics [20 Marks]

5. Develop a particle emitter that emits a constant stream of particles from the centre of the screen to the top of the screen. Use an array of a linked list to keep track of all the different particles in the system.
[5 Marks]

6. Add an appropriate gravitational force to the particles on screen to pull them to the bottom right of the screen.
[5 Marks]

7. Alter the particle system so that the by decreasing a *life* variable everytime the position of a particle is calculated you can alter the alpha channel of a particle to gradually remove a particle from the simulation.
[10 Marks]

Section 3—Game Artificial Intelligence [20 Marks]

8. Using your answer to question 4. Develop an example of the Chase AI. Use simple place holder graphics (different coloured shapes) to represent the the enemy and player objects on screen. The player character will need to be human controlled and will need

to respond to W, A, S, D keyboard input. The computer controlled AI will need to move at an appropriate pace and follow the human player.

[10 Marks]

9. Extend your answer to question six by including obstacles in the grid that neither the player or the computer AI can move through. Develop code to detect obstacles for both the player and enemy characters.

[10 Marks]

Section 4 – Game Sprites [20 Marks]

10. Using your answer to question 4. Develop a Sprite class or structure to allow a character to move around a grid based game world. Use different animation frames for the up, down, left and right directions. You may use any freely available sprite sheet that you like or you could make your own.

[10 Marks]

11. Add user control to your game sprite and allow a human character to control the position of the sprite inside the game world.

[5 Marks]

12. Add obstacles to your game world that take up different amounts of space. Change the Sprite class to allow the Sprite to walk around the obstacles.

[5 Marks]

Section 5—Problem Solving Capability [20 Marks]

13. Write approximately 500 words, describe the major game development problems you have overcome in your 2D sprite project. Please describe your solutions to these problems.

[20 Marks]

Submission Details:

- This is an individual assignment.
- You must work on the individual tasks by yourself and all work on these tasks must be your own.
- Your final submission should include a visual project answering each question as well as a text file containing your answer to question 13.
- When submitting the work via the Moodle as part of your assessment submission you agree that the work is your work and your work alone.

Assignment hand-in:
Assignments submitted after the due date and time without having received an extension through Special Assessment Circumstances (SAC) will be penalised according to the following:

- 10% of marks deducted if submitted within 24hrs of the deadline
- 20% of marks deducted if submitted after 24hrs and up to 48hrs of the deadline
- 30% of marks deducted if submitted after 48hrs and up to 72hrs of the deadline
- No grade will be awarded for an assignment that is submitted later than 72hrs after the deadline.
- Students submitting assignments after the due date and time will be ineligible to resubmit a failed assignment.

Special Assessment Circumstances:
A student, who due to circumstances beyond his or her control, misses a test, final examination or an assignment deadline or considers his or her performance in a test, final examination or an assignment to have been adversely affected, should complete the Special Assessment Circumstances (SAC) form available from Student Central.

Within any semester, a student may have only one SAC per course.

When requesting an SAC for an assignment, the SAC form must be submitted (along with work completed to date) within the time frame of the extension requested; i.e. if the Doctor's certificate is for one (1) day, then the SAC form and work completed must be submitted within one (1) day.

Unacceptable Assistance

- Working together on one copy of the assessment and submitting it as own work.
- Giving another student your work.
- Copying someone else's work. This includes work done by someone not on the course.
- Copying from books, Internet etc. and submitting it as own work. Anything taken directly from another source must be acknowledged correctly: show the source alongside the quotation.
- Changing or correcting another student's work.

Have a query? Want to improve your work?

You could:

- Talk it over with your lecturer, course coordinator, and programme leader.
- Visit Te Puno Ako or Maia for learning advice and support.
- Visit the Centre for Pacific Development and Support.
- Contact Ed Collective Advocate for independent advice.
- For contact details and more information, go to www.usu.co.nz (http://www.usu.co.nz)

This is an individual assignment. You must work on the individual tasks by yourself and all work on these tasks must be your own.

Please sign the statement below to declare that this assignment submission is your own work and hand in the signed statement with your assignment. Failure to sign and include this statement may mean your assignment is not marked.

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Take Home Test

I declare that the individual part of this assignment submission is my own work. Where I have incorporated work by other people, I have correctly acknowledged the source in my assignment.

Student Name …….. Student ID ……..…

Date: ……..