Unit:
Designing and Developing Object-Oriented Computer Programs

Assignment title:
QuickClicker

December 2015

Important notes

- Please refer to the Assignment Presentation Requirements for advice on how to set out your assignment. These can be found on the NCC Education *Campus*. Click on Policies and Advice in the left-hand menu and look under the Advice section.
- You must read the NCC Education documents 'What is Academic Misconduct? Guidance for Candidates' and 'Avoiding Plagiarism and Collusion: Guidance for Candidates' and ensure that you acknowledge all the sources that you use in your work. These documents are available on *Campus*. Click on Policies and Advice in the left-hand menu and look under the Policies section.
- You **must** complete the **'Statement and Confirmation of Own Work'**. The form is available on *Campus*. Click on Policies and Advice in the left-hand menu and look under the Policies section.
- Please make a note of the recommended word count. You could lose marks if you write 10% more or less than this.
- You must submit a paper copy and digital copy (on disk or similarly acceptable medium). Media containing viruses, or media that cannot be run directly, will result in a fail grade being awarded for this assessment.
- All electronic media will be checked for plagiarism.

Introduction

There exists a class of video games known as 'incremental games'. These games work by having a player perform some simple action in order to gain points. The points can then be spent on upgrades that allow the player to gain points at a faster rate. A very popular version of this type of game is 'Cookie Clicker', which you can see here:

http://orteil.dashnet.org/cookieclicker/

Your task is to create a simple incremental game of your own. It will take the form of one large button – each click of this button will award the player with a point. Your game should show you how many points the player has earned this way.

You will also need to provide a 'shop' from which players can buy upgrades. These will increase the number of points gained by clicks, or give some 'passive' point generation. Each time an upgrade is purchased, the cost goes up. The two types of upgrade you must provide are:

1. Click Enhancement, which increases the number of points gained per click by one for each time the upgrade has been purchased.
2. Passive Click Generation, which generates X point(s) per Y second(s), every time the upgrade has been purchased.

You should provide several of each upgrade. For example, you might provide the following for the player to buy:

Name	Description	Base Cost	Cost Increment
Super Click	Increases the number of points gained per click by 1	20	1.2
Click Factory	Generates 1 point every ten seconds	100	1.5
Click Multiplier	Doubles the number of points gained for each click	1000	2
Click Machine	Generates 2 points every five seconds	10000	1.2

When the player has gained 20 points, they can buy a Super Click upgrade, which will then give them two points every time the button is clicked. The next Super Click upgrade will cost 22 points, and give them 3 points per click.

Upon getting 100 points, they can buy a click factory which gives them one point every ten seconds. The second click factory will cost them 150 points. The third will cost them 225 points (1.5 x 150).

Scenario continues on next page

Your game should also provide a set menu of power-ups that improve the functionality of upgrades. These can only be purchased once each. For example:

Name	Description
Efficient Workers	Increases the points generated by every factory by one.
We All Click Together	For every Click Factory you own, you increase the number of points gained for each click by one.
New Management	Increases all points gained by 10%

Upon purchasing a power-up, the option should be greyed out and no longer possible to purchase.

There is little more in the way of gameplay or mechanics to an increment game – it is largely designed to be played during 'idle' moments. You do not need to implement the upgrades shown above – you have free rein to decide for yourself what these should be, and the costs, and the benefits. Your program will need to perform the following operations:

- Set up the GUI;
- Set up a program loop to handle each of the passive click upgrades;
- Create a 'shop' interface that allows for upgrades to be purchased;
- Handle game state for the number of points a player has gained, and how many of each upgrade they have purchased;
- Provide a shop through which power-ups can be purchased;
- Correctly calculate number of points gained based on all existing purchased upgrades;
- Correctly calculate the cost of upgrades based on base cost and cost increment.

Task 1 – The Application 50 Marks

The program should fully meet the requirements of the brief as outlined above. The program algorithms should make effective use of all available tools and should involve functions, loops, selection classes, objects and either array or string manipulation. 10 marks are available for **each** of the following: (1) Appropriate use of objects; (2) Handling user interaction; (3) Upgrades; and (4) Encapsulation and Abstraction. 5 marks are available for: (1) Power-Ups; and (2) Points per second.

Task 2 – Testing Data (25 Marks)

Testing data should be sufficient to provide suitable coverage of all equivalence classes, and should use black box and white box testing to explore each function. The marks for this task are broken down as follows: (1) 10 marks for developing a test plan; (2) 10 marks for implementing a test plan; and (3) 5 marks for making effective use of exception handling.

Task 3 – Design Documentation (25 Marks)

A fully detailed UML diagram of their classes should be submitted. The marks for this task are broken down as follows: (1) 5 marks for class relationships; and (2) 20 marks for methods and attributes.

Submission requirements

- Your program must be submitted as a zip file of the full project.
    - Whatever IDE you use, it should be possible to open and run the project directly from the extracted archive.
- Your testing data must be accompanied with a short, 100 word discussion of how the data was selected and executed.

Candidate checklist

Please use the following checklist to ensure that your work is ready for submission.

Have you read the NCC Education documents 'What is Academic Misconduct? Guidance for Candidates' and 'Avoiding Plagiarism and Collusion: Guidance for Candidates' and ensured that you have acknowledged all the sources that you have used in your work?	❑
Have you completed the 'Statement and Confirmation of Own Work' form and attached it to your assignment? **You must do this.**	❑
Have you ensured that your work has not gone over or under the recommended word count by more than 10%?	❑
Have you ensured that your work does not contain viruses and can be run directly?	❑