

CSC 106 Assignment 1

Due: Sun, Sept 23, 2012 at 11:55 pm

Marks: 50 marks.

Learning Goals:

At the end of this assignment you will be able to:

- Create a brief biography of a Canadian computer scientist;
- Analyze a step by step activity and create a pseudo-code algorithm describing it;
- Analyze a step by step activity and create a flow-chart describing it;
- Move between binary (base 2), decimal (base 10), and hexadecimal (base 16) encodings ;

Submission: This assignment is to be done individually. The submitted assignment can be either a .doc, .docx, .pdf, .rft, or .pages file. It should be attached to the CSC106 Assignment 1 submission page on Connex.

A few reminders:

---- Make sure that you include your NAME, STUDENT #, and email in the Assignment Text box on Connex. As well, please make sure that your NAME and STUDENT# are on the submitted file itself.

-- Please make sure that you include the Task number/section you are answering above your response. This makes it easier for your marker to stay with the flow of your answers.

-- Make sure that your file is attached before you click the final submission button on Assignment 1 in Connex. There is a bug in the Connex submission attachment, so you only get one chance to submit your work. Make sure it is all there before you press the final submit.

Resources:

- Example of an introduction: Check out the introduction Mary gave for Dr. Kelly Gotlieb when UVic conferred an honorary degree on him in the November 2011 convocation:
Go to 58:36 in this streaming web site <http://www.uvic.ca/convocation/past/2011-nov-10-pm.php>

Her introduction is 600 words long - yours will only be 200 max.

- A basic introduction to flowcharts (don't worry about the actual computer code, concentrate on the flowchart as a graphic representation of an algorithm:
<http://www.eod.gvsu.edu/~blauch/c2d2/Structured%20Design%20Using%20Flowcharts.pdf>

- A basic description of several techniques for checking the "primality" of an integer can be found here: <http://www.wikihow.com/Check-if-a-Number-Is-Prime>

TASK 1: Create a brief introduction to a Canadian Computer Scientist (15 marks)

You are tasked with introducing a visiting Canadian computer scientist to an audience of about 150 people. In general, the audience members are well educated and informed. However, they ARE NOT computer scientists.

In your own words write a brief introduction - no more than 200 words - designed to "bring the audience up to speed" on some of the accomplishments of this Canadian computer scientist. Your introduction should give the audience some sense of why these accomplishments are important and/or what they mean in the bigger picture of computer science and technology.

You may select any Canadian computer scientist you like. The scientist can be a Canada and living here or abroad. The scientist can be born in Canada, or could have immigrated here -- indeed, you may select anyone who self-identifies her or himself as Canadian. The only Canadian computer scientist you may not use is Dr. Kelly Gotlieb from the University of Toronto (check out the Resources to see why you can't use Kelly).

List and cite the reference materials you used for the introduction directly below the introduction itself. You may use any citation style you like (e.g. MLA, APA, etc.).

Resources:

This can be hard to do if you've not prepared an introduction before. It is especially difficult to do when you are restricted to about 200 words and when you are preparing the introduction for a non-specialist audience.

For an idea of what you might put into such an introduction check out the introduction Mary gave for Dr. Kelly Gotlieb when UVic conferred an honorary degree on him in the November 2011 convocation:

Go to 58:36 in this streaming web site

<http://www.uvic.ca/convocation/past/2011-nov-10-pm.php>

Her introduction is 600 words long - yours will only be 200 max.

TASK 1 DELIVERABLES: A word processed document containing the Task heading, the introduction (written in your own word), and references/citations listed below the introduction. Marks will be assigned as follows:

5 marks - accuracy of content

5 marks - relating accomplishments to the bigger computer science picture.

5 marks - grammar, spelling, and communication skills

(This Task is worth 15 marks).

TASK 2: Analyzing an algorithm. (5 marks)

In the most general sense an algorithm is a set of step-by-step instructions designed to solve a problem. As you will have seen from readings and lectures in the first two weeks of this course, sometimes recipes are used as a metaphor for algorithms. Consider the recipe below:

Gautam's Tasty French Toast

- Combine 2 slightly beaten eggs with 1 tsp vanilla extract, ½ tsp cinnamon, 1 cup milk
- Dip 6 slices of bread in mixture
- Fry in small amount of butter until golden brown
- Serve bread with maple syrup, sugar, or oregon grape jelly

While most of us could probably follow this recipe and create a tasty breakfast, this recipe fails as an algorithm.

List five ways this recipe fails as an algorithm and describe why these are problems. It helps if you imagine a programmable robot using this recipe to make French Toast.

TASK 2 DELIVERABLES:

Using the same word processed document as you created for Task 1 make a new Task 2 heading. put a copy of the recipe under the Task 2 heading and give your answer. Marks will be assigned as follows:

2 marks for correctly identifying five problems.

3 marks for well reasoned problem descriptions.

(This Task is worth 5 marks).

TASK 3: Algorithm creation - flow charting and pseudo-code. (20 marks)

Try your hand at creating an algorithm designed to determine if a given positive integer is a prime number. Assume that all data coming to the algorithm has already been checked and is indeed valid integer data. Moreover, assume the integer is, at most, 5000.

TASK 3 DELIVERABLES: Using the same word processed document as you created for Task 1 make a new Task 3 heading. Below this heading, create a flow chart that describes your algorithm to test for primality. Use flow chart symbols as discussed in class for your diagram. Include a key to the flow chart symbols.

Below your diagram please write out your algorithm in English-based pseudo code.

5 marks for correct logic and good structure.

5 marks for correct flow of control through the program.

5 marks for readability of pseudo code.

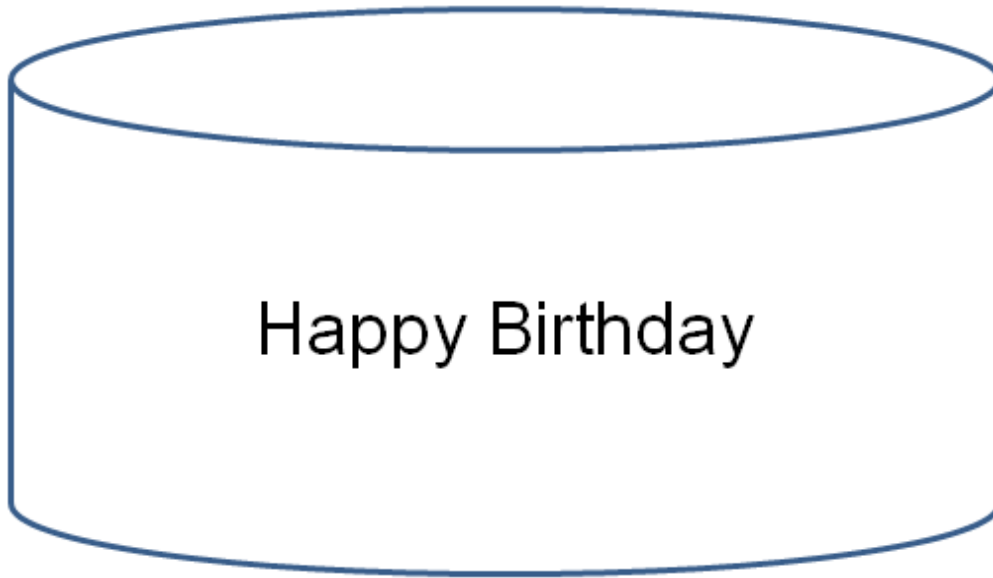
5 marks for correct flow chart diagram.

This Task is worth 20 marks

TASK 4: Some binary fun (5 marks)

Mary turned 55 (base 10) a few days ago -- I can tell you, getting old is not for sissies! Her husband, also a computer scientist, says he can't fit 55 candles on my cake. He has decided to use binary to represent age on the cake with candles. How will he arrange the candles and make them represent 55 in binary (base 2)? Draw your answer on my cake.

You can use the graphic below if you like. Or, you can create one yourself.



Now that Mary is 55 I feel she can release her inner geek – She's not going to use base 10 ever again when talking about my age. She's going to use base 16. What is her age in hexadecimal (base 16).

TASK 4 DELIVERABLES: Using the same word processed document as you created for Task 1 make a new Task 4 heading and put your completed diagram below it. Describe any assumptions that are represented in your diagram. Answer the base 16 question below the diagram.

3 marks for correctly representing my age in candles using base 2.

2 marks for correctly answering the base 16 question.

This Task is worth 5 marks.

OVERALL ASSESSMENT:

Five marks are set aside for overall assessment. 4 to 5 marks are given for outstanding work. The assessment proceeds as follows:

5 marks given for an outstanding assignment - original thought, outstanding organization, well demonstrated analysis and synthesis capabilities, excellent grasp of subject matter with sound critical evaluations throughout.

4 marks given for strong evidence of original thinking; excellent organization; capacity to analyze and synthesize; superior grasp of subject matter with sound critical evaluations. All other material in the assignment is correctly completed in an exemplary manner.

1-3 marks given for evidence of grasp of subject matter, some evidence of critical capacity and analytic ability; reasonable understanding of relevant issues; evidence of familiarity with the concepts. All other material in the assignment is correctly completed.

Final note -- the staff at the **Computer Science Consultants Office (Help Desk)** are there to help you. They can't "do" the assignment for you, but they can help out with application problems, printer problems, understanding questions, saving documents, uploading and moving files, etc. Call on them for help.