CS 161A: Programming and Problem Solving I

Discussion 1 Algorithmic Design Document

Make a copy before you begin (File -> Make a copy). The sections will expand as you type. When you are finished, download this document as a PDF (File -> Download -> PDF) and submit to D2L.

This document contains an interactive checklist. To mark an item as complete, click on the box (the entire list will be highlighted), then right click (the clicked box will only be highlighted), and choose the checkmark.

Planning your program before you start coding is part of the development process. In this document you will:

- ❑ Write a detailed description of your program, at least two complete sentences
- ❑ If applicable, design a sample run with test input and output
- ❑ Identify the program inputs and their data types
- ❑ Identify the program outputs and their data types
- ❑ Identify any calculations or formulas needed
- ❑ Write the algorithmic steps as pseudocode or a flowchart
- ❑ Tools for flowchart - Draw.io - Diagrams.net

Program Description

In the box below, describe the purpose of the program. You must include a detailed description with at least two complete sentences.

Program description:
With this program, I want to teach someone how to eat an ice cream cone, where they can pick 2 flavors, 1 for each scoop. The ice cream will be on a cake cone. If the ice cream is eaten, you should expect no ice cream or cake cone leftover.

Sample Run

If you are designing your own program, you will start with a sample run. Imagine a user is running your program - what will they see? What inputs do you expect, and what will be the outputs from the given inputs? Choose test data you will use to test your algorithm. Calculate and show the expected outputs. Use the sample run to test your algorithm.

Sample run:
“We are going to learn how to eat ice cream today!”

```
Pick a flavor for the first scoop of ice cream: chocolate

Pick a flavor for the first scoop of ice cream: vanilla

The ice cream is being scooped on a cake cone.

Have you eaten the ice cream scoops and cone yet? Yes/No

Congrats on eating your first ice cream cone today!
```

Algorithmic Design

Before you begin coding, **you must first plan out the logic** and think about what data you will use to test your program for correctness. All programmers plan before coding - this saves a lot of time and frustration! Use the steps below to identify the inputs and outputs, calculations, and steps needed to solve the problem.

Algorithmic design:
a. Identify and list all of the user input and their data types.
Ice cream scoop 1 flavor - string Ice cream scoop 2 flavor - string Finished ice cream?: boolean
b. Identify and list all of the user output and their data types.
The user will have chosen their 2 flavors of ice cream, and have eaten it by the end. Cake cone - boolean Ice Cream Cone flavor selection for scoop 1 - string Ice Cream Cone flavor selection for scoop 2 - string Scoop1 + scoop2: integer

Finished ice cream: “YES” - String

Finished ice cream: “NO” - String

c. What calculations do you need to do to transform inputs into outputs? List all formulas needed, if applicable. If there are no calculations needed, state there are no calculations for this algorithm.

cakeCone + scoop1 + scoop2 = iceCreamConeComplete

d. Design the logic of your program using pseudocode or flowcharts. Here is where you would use conditionals, loops or functions (if applicable) and list the steps in transforming inputs into outputs. Walk through your logic steps with the test data from the assignment document or the sample run above.

```
DECLARE: cakeCone

DECLARE: scoop1

DECLARE: scoop 2

DECLARE: iceCreamConeComplete = scoop1 + scoop2 +cakeCone

INPUT: Get the flavor 1 for scoop1 from the user in terminal

SET: scoop1

DISPLAY: “You chose <insert user flavor> for scoop1 !”

INPUT: Get the flavor 2 for scoop2 from the user in terminal

SET: scoop2

DISPLAY: “You chose <insert user flavor> for scoop2 !”

DISPLAY: “You now have a complete ice cream cone with flavors, scoop1 and scoop2 =
iceCreamConeComplete!”
```