The University of North Carolina at Greensboro
CSC 100: The Beauty and Joy of Computing
Prof. Stephen R. Tate

Handout 5
September 18, 2017

Homework 2 – Due Wednesday, September 27

This assignment is a sampling of some of the kinds of questions you can expect on the midterm exam. The exam will be closed book and with no calculators allowed, so as you prepare for the exam make sure you can answer the questions under those conditions! These questions cover material up through Lecture 8 and Lab 5. Over the next two weeks we will be covering some very important material that will be on the midterm (on algorithms and introducing Python programming), so don't think this assignment is comprehensive coverage of exam topics!

1. (Short answer) In the lecture on abstraction, we talked about the two main types of abstraction. What are they? For each one, name it and give a brief one sentence description and an example (one more sentence sentence) that clearly illustrates the type of abstraction.

2. (Short answer) In *Blown to Bits* the authors talk about leaving digital "footprints" and digital "fingerprints". Briefly state what they mean by footprints and fingerprints (making sure you identify how they are different), and give one example of each.

3. (Short answer) There are two distinct roles in a pair programming setting — give the name of each role along with a brief description of what the person in that role does.

4. (Base conversions) Perform the following base conversions (a table showing hexadecimal digits is to the right for your convenience):

   (a) Convert 22_{10} to binary.
   (b) Convert 21_{10} to binary.
   (c) Convert 38_{10} to binary.
   (d) Convert 10110_2 to decimal.
   (e) Convert 101011_2 to decimal.
   (f) Convert 110011_2 to decimal.
   (g) Convert 101101_2 to hexadecimal.
   (h) Convert 1101010_2 to hexadecimal.
   (i) Convert 1011110_2 to hexadecimal.
   (j) Convert 1A_{16} to binary.
   (k) Convert 3E_{16} to binary.
   (l) Convert 5C_{16} to binary.

$0000_2 = 0_{16}$
$0001_2 = 1_{16}$
$0010_2 = 2_{16}$
$0011_2 = 3_{16}$
$0100_2 = 4_{16}$
$0101_2 = 5_{16}$
$0110_2 = 6_{16}$
$0111_2 = 7_{16}$
$1000_2 = 8_{16}$
$1001_2 = 9_{16}$
$1010_2 = \text{A}_{16}$
$1011_2 = \text{B}_{16}$
$1100_2 = \text{C}_{16}$
$1101_2 = \text{D}_{16}$
$1110_2 = \text{E}_{16}$
$1111_2 = \text{F}_{16}$

5. (Writing code) Using the "hand-written Snap!" format (see class handout), sketch out a script that counts how many even numbers are in the list stored in a variable named "test list."

6. (Writing code) Consider a situation in which a variable named "players" contains a list of names of players in a game. Write a program for Alonzo so that he says "Welcome" with each players name, for 1 second each. (Example: if the list contains names "Alice", "Bob", and "Carol", then Alonzo would say "Welcome Alice" for 1 second, then "Welcome Bob" for 1 second, and finally "Welcome Carol" for 1 second.)

7. (Run the code) Look at the code for this question on the following page. What is the value of the variable "test" after this program runs?

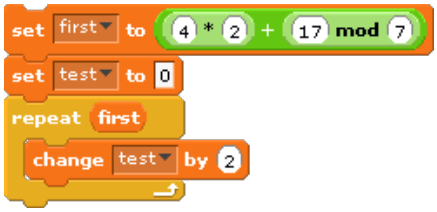
8. (Mystery block) Describe what the block "mystery1" on the following page computes. In addition to describing what it computes in general, specifically say what value it would report if called with string "ab12cd5de7". *As in the lab quizzes, make sure your general description focuses on a high level description – do not say anything about what individual blocks or steps do when it is computing.*

9. (What's wrong) The block "bad range ..." on the following page is supposed to implement the "range ..." block that you made in Lab 5 (to create a list containing values 0 through *pSize*-1), but it doesn't work correctly. What is wrong, and how could you fix it?

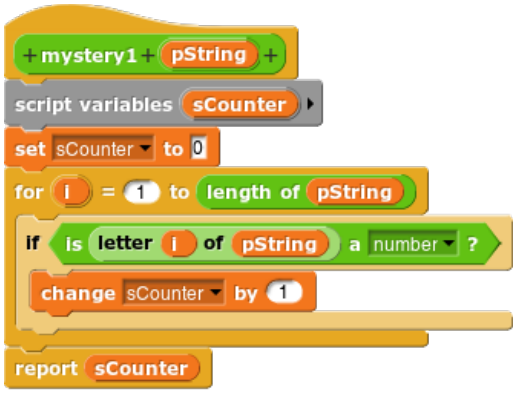
10. (What's wrong) The block "bad how many" on the following page is count how many times a name (parameter pName) occurs in a list of names (parameter pList), but it doesn't work correctly. What is wrong, and how could you fix it?

Snap! Code for Homework 2

Code for Question 7



Code for Question 8



Code for Question 9

Code for Question 10