

CSC2-140 Foundations of Computer Science

Exam 1 Part 1 October 11, 2017

solution

name _____

This exam has 2 parts and this is part 1. This part is worth 60 points. Closed book, closed notes. You may not use any devices while taking this part of the exam.

1. (6 pts.) How many times in each of the following loops is the print statement executed? Briefly explain.

a. for i in range(2,25,5):
 print("Executed.")

2, 7, 12, 17, 22

(5)

b. for i in range(25,2):
 print("Executed.")

no times

init val not < stop

c. tester = 10
while (tester > 1):
 tester = tester//2
 print("Executed.")

10 5 2 1 stop

(1 1 1)

(3)

2. (6 pts.) Using the information provided in the table and nested conditionals, write an if statement that determines which sport a person prefers based on the interests (indoor vs. outdoor, summer vs. winter). Let likesSummer and likesIndoor be variables of type boolean, and let preferredSport be a variable of type String that will store the preferred sport.

	Likes Indoor	Likes Outdoor
Likes Summer	Basketball	Soccer
Likes Winter	Hockey	Skiing

```

if likesSummer:
    if likesIndoor:
        pS = "BB"
    else:
        pS = "Soc"
else:
    if likesIndoor:
        pS = "Hoc"
    else:
        pS = "Sk"
    
```

pS = "Sk"

3. (2 pts.) Yesterday, October 10, 2017, was Ada Lovelace Day. For what is Ada Lovelace famous?

The first programmer.

4. (3 pts.) Give the flow of execution of the following code by listing the line numbers of statements executed in order:

1, 5, 9, 10, 6, 2, 3, 7, 11

```
1. def pow(b, p):
2.     y = b ** p
3.     return y
4.
5. def square(x):
6.     a = pow(x, 2)
7.     return a
8.
9. n = 5
10. result = square(n)
11. print(result)
```

5. (5 pts.) Here is a Python for loop. Rewrite this code using a while loop instead of a for loop.

```
accum = 0
for count in range(100):
    accum = accum + count
print(accum)
```

```
accum = 0
count = 0
while count < 100:
    accum = accum + count
    count = count + 1
print(accum)
```

6. (10 pts.) Complete the following table by filling in the value and type of each expression. You may assume that x has value 4.7 and i has value 12 in the expressions below.

Expression	Value	Type/Class
3 + 2	5	int
20%i	8	int
i < 10 and x != 1.0	False	boolean
10/i	0	int
2*i == 24	True	boolean
2+3*4-5	9	int

7. (10 pts.) For the program listing below, circle **one** example of each of the following, and place the matching number next to your circle. If there isn't an example of the thing in the program listing, make this note on the program listing.

1. a global variable
2. a local variable
3. a formal parameter
4. an argument/actual parameter
5. a fruitful function header *none*
6. an unfruitful function header
7. a function invocation
8. a class constructor call
9. a module name
10. a docstring

```

import turtle
def drawSquare(t, sz):
    """Make turtle t draw a square of with side sz."""
    for i in range(4):
        t.forward(sz)
        t.left(90)
wn = turtle.Screen()
wn.bgcolor("lightgreen")
alex = turtle.Turtle()
drawSquare(alex, 50)
wn.exitonclick()

```

Handwritten annotations on the code:

- 9 above `import turtle`
- 3 above `def drawSquare(t, sz):`
- 6 above `def drawSquare(t, sz):`
- 10 above the docstring
- 2 above `for i in range(4):`
- 7 above `t.left(90)`
- 8 above `wn = turtle.Screen()`
- 4 above `alex = turtle.Turtle()`

8. (2 pts. each) Fill in the blanks.

- a. A program development plan intended to simplify debugging by adding and testing only a small amount of code at a time is called incremental development.
- b. Indefinite iteration occurs in a loop where we just need to keep going until some condition is met. A while statement is used for this case.
- c. A step-by-step process for solving a category of problems is a(n) algorithm.
- d. An expression that is either true or false is a(n) boolean expression.
- e. A number that is not genuinely random but is instead created algorithmically is a(n) pseudo random number.
- f. The range of statements in the code where a variable can be accessed is a variable's scope.

9. (6 pts.) a. What will the following code print if $x = 3$, $y = 5$, and $z = 2$? Show your work.

```
if x < y and x < z:  
    print("a")  
elif y < x and y < z:  
    print("b")  
else:  
    print("c")
```

$3 < 5 \wedge 3 < 2$ F
 $5 < 3 \wedge 5 < 2$ F
✓

"c"

b. What is printed by this code? Show your work.

```
n = 1  
x = 2  
while n < 5:  
    n = n + 1  
    x = x + 1  
    n = n + 2  
    x = x + n  
print(n, x)
```

$1 < 5$
 $n \rightarrow 2$
 $x \rightarrow 3$
 $n \rightarrow 4$
 $x \rightarrow 7$

$4 < 5$
 $n \rightarrow 5$
 $x \rightarrow 8$
 $n \rightarrow 7$
 $x \rightarrow 15$

7
45
(7, 15)