# COSC 101, Exam #1
# 23 September 2016

Name: ______________________________ Section: 8:20 / 9:20 /10:20 / 11:20

You have 50 minutes to complete this exam.

There are 5 questions and a total of 46 points available for this exam. Don't spend too much time on any one question.

Since indentation is important in Python, please be sure that your use of indentation is obvious for any code you write.

If you want partial credit, show as much of your work and thought process as possible.

If you run out of space for answering a question, you can continue your answer on one of the blank pages at the end of the exam. If you do so, be sure to indicate this in two places: (1) below the question, indicate which blank page contains your answer, and (2) on the blank page, indicate which question you are answering.

| Question | Points | Score |
|---|---|---|
| 1 | 8 | |
| 2 | 8 | |
| 3 | 10 | |
| 4 | 10 | |
| 5 | 10 | |
| Total: | 46 | |

1. (8 points) Assume that the following statements have already been executed:

```
month = 6
day = 30
ordinal = "17th"
name = 'Brian'
```

For each of the following expressions, evaluate the expression and write the resulting value, or identify the error in the code that would prevent it from running.

(a) `day / 10 * ordinal`

**Solution:**

```
'17th17th17th'
```

(b) `day + ordinal`

**Solution:**

```
Error: unsupported operand type(s) for +: 'int' and 'str'
```

(c) `(month - 2) % month`

**Solution:**

```
4
```

(d) `len(ordinal) < month or min(month, month ** 4) > len(name)`

**Solution:**

```
True
```

(e) `int(ordinal[-3]) - int(ordinal[0])`

**Solution:**

```
6
```

(f) `float (day / month)`

**Solution:**

```
5.0
```

(g) `month / (int(ordinal[0]) - 1)`

**Solution:**

```
Error: integer division or modulo by zero
```

(h) `name[0] = 'b'`

**Solution:**

```
Error: 'str' object does not support item assignment
```

2. (a) (4 points) What is the output of the following program?

```
people = 23
cupcakes = 36
per_person = 2

if (cupcakes / per_person < people):
    print 'make more cupcakes, there aren\'t enough'
    if per_person > 1:
        print "everyone *really* likes cupcakes"
    else:
        print "even though cupcakes are just okay"
if cupcakes >= people:
    print "we might be able to make this work"
else:
    print "we definitely need more cupcakes"
```

**Solution:**

```
make more cupcakes, there aren't enough
everyone *really* likes cupcakes
we might be able to make this work
```

(b) (4 points) What is the output of the following program?

```
size = 2
for i in range(size+1):
    print "i",
    for j in range(i):
        print "duck",
    print "goose"
    print "--" + "-" * i
```

**Solution:**

```
i goose
--
i duck goose
---
i duck duck goose
----
```

3. (10 points) Write a program that asks a user for his/her team name and prints an announcer's "cheer" in a particular format. If the user types "Jays", the output should be:

```
Goal! Jays win!
Gooal! Jays win!
Goooal! Jays win!
Gooooal! Jays win!
```

That is the number of lines the program prints is equal to the number of charaters in the team name and the number of times the "o" in "Goal" is printed increases by one on each line.

As another example, if the user types the name "raiders", the output should be:

```
Goal! raiders win!
Gooal! raiders win!
Goooal! raiders win!
Gooooal! raiders win!
Goooooal! raiders win!
Gooooooal! raiders win!
Goooooooal! raiders win!
```

**Solution:**

```
team_name = raw_input("What is your teams name?: ")

for index in range(len(team_name)):
    print "Go" + "o"*index + "al! " + team_name + " win!"
```

4. (10 points) The owner of a local shop is tired of writing receipts and adding numbers by hand. She hires you to write a receipt program totaling scanned items. Items can either be articles (with a positive cost) or coupons (with a negative cost). Write a program that asks first the number of items to be scanned and then asked the cost of each item. Finally the program should print the total amount owed and the total savings if any from the coupons. Here is an example for three items, including one coupon.

```
How many items are being scanned?: 3
Cost of item 1: 4.5
Cost of item 2: 5.3
Cost of item 3: -1.01
The total cost of all 3 items is $8.79.
You saved $1.01 with your coupons!
```

Here is another example with multiple coupons:

```
How many items are being scanned?: 5
Cost of item 1: 1.75
Cost of item 2: -4.97
Cost of item 3: 2
Cost of item 4: -0.03
Cost of item 5: 1.3
The total cost of all 5 items is $0.05.
You saved $5.0 with your coupons!
```

Your program must match the format shown in the examples *exactly*. You may assume that the total cost of all items is not negative.

**Solution:**

```
num_items_to_scan = int(raw_input("How many items are being scanned?: "))

total_cost = 0.0
total_coupon_cost = 0.0

for item_number in range(num_items_to_scan):
    item_cost = float(raw_input("Cost of item " + str(item_number+1) + ": "))

    total_cost += item_cost
    if item_cost < 0.0:
        total_coupon_cost += item_cost

print "The total cost of all", num_items_to_scan,
print "items is $" + str(total_cost) + "."
print "You saved $" + str(-total_coupon_cost) + " with your coupons!"
```

5. (10 points) Write a program that asks the user to enter a text message and finds the starting index of the most repeated `'a'`s, called a *run* of `'a'`s. Some examples are below:

   - If the user enters `'aaaalrighty then!'`, your program should compute an index of `0`.
   - If the user enters `'lmao'`, your program should compute an index of `2`.
   - If the user enters `'yay.yay.yaaaaay!'`, your program should compute an index of `9`, because that is the index of the first `'a'` in the longest run of `'a'`s.
   - If the user enters `'heeeeeyy!!!  wuts up?'`, your program should indicate that there is no run of `'a'`s.
   - You may assume there will never be a tie for longest run of `'a'`s.

   Your program's output should be formatted as shown in the examples below:

```
Enter your text message: What's haaaapening?
Longest run of 'a's starts at index 8
```

```
Enter your text message: this is some text
No 'a's found
```

**Solution:**

```
phrase = raw_input("Enter your text message: ")

longest_run_index = -1
current_run_index = -1
longest_a_count = 0
current_a_count = 0

for index in range(len(phrase)):
    if phrase[index] == 'a':
        if current_a_count == 0:
            current_run_index = index
        current_a_count += 1
        if current_a_count > longest_a_count:
            longest_a_count = current_a_count
            longest_run_index = current_run_index
    else:
        current_a_count = 0
        current_run_index = -1

if longest_run_index == -1:
    print "No 'a's found"
else:
    print "Longest run of 'a's starts at index", longest_run_index
```

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