

COSC 101, Exam #1

27 February 2018

Name: _____ Section: MWF 9:20 / TR 8:30 / TR 9:55

Instructions and Advice:

- Do not open the exam until instructed to do so.
- Write your name and circle your section.
- You have 90 minutes to complete this exam, use your time wisely.
- There are 5 questions and a total of 50 points available for this exam. Don't spend too much time on any one question.
- If you want partial credit, show as much of your work and thought process as possible.
- Since indentation is important in Python, please be sure that your use of indentation is obvious for any code you write.
- It is not necessary to write comments.
- If you run out of space while answering a question, you can continue your answer on one of the scrap 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 scrap page contains your answer, and (2) on the scrap page, indicate which question you are answering.

Question	Points	Score
1	8	
2	12	
3	8	
4	10	
5	12	
Total:	50	

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

```
a = 11
b = 2.5
c = True
d = '8'
e = 'February'
```

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) `c == (b * 4 < a)`

Solution:

True

(b) `int(d) / int(b)`

Solution:

4.0

(c) `e + str(a * 2) + 'is' + "George Washington's Birthday"`

Solution:

"February22isGeorge Washington's Birthday"

(d) `d < e or not c`

Solution:

True

(e) `(str(b) + a) + d`

Solution:

Error: must be str, not int

(f) `min(a % int(d), float(d) // int(b))`

Solution:

3

(g) not c or not c

Solution:

False

(h) a // int(b) * d

Solution:

'88888'

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

```
temperature = -7
thickness = 2.0
if (temperature >= -9 and temperature <= -5):
    print(temperature, "C is good for speed skating")
    if (thickness < 2.5):
        more = 2.5 - thickness
        print("The ice needs to be", more, "cm thicker")
    else:
        print(thickness, "cm is thick enough ice")
        print("According to Mark Messer")
elif (temperature < -3):
    print(temperature, "C is good for figure skating")
    if (thickness >= 4.5 and thickness <= 5):
        print(thickness, "cm ice is good")
else:
    print("The ice is all wrong")
```

Solution:

```
-7 C is good for speed skating
The ice needs to be 0.5 cm thicker
According to Mark Messer
```

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

```
for i in range(1,6):
    print(i, 'produces', i ** 2)

for j in range(6, 0, -2):
    if (j % 3 == 0):
        print(str(j) + ' is divisble by 3')
    else:
        print(str(j) + ' is not')
```

Solution:

```
1 produces 1
2 produces 4
3 produces 9
4 produces 16
5 produces 25
6 is divisble by 3
4 is not
2 is not
```

(c) (4 points) What is the output of the following program, if the user enters 4?

```
repeat = int(input("Enter the number of verses: "))
ants = 1
for i in range(repeat):
    print('The ants go marching', i, 'by', ants)
    ants = ants * 2
    print('hurrah ' * (i + 1))
print('And ' + str(ants) + ' ants go marching down into the ground')
```

Solution:

```
The ants go marching 0 by 1
hurrah
The ants go marching 1 by 2
hurrah hurrah
The ants go marching 2 by 4
hurrah hurrah hurrah
The ants go marching 3 by 8
hurrah hurrah hurrah hurrah
And 16 ants go marching down into the ground
```

3. (8 points) Write a program that calculates the total purchase amount charged by an online clothing retailer. The program should ask for the merchandise subtotal and the desired shipping speed, then calculate the shipping cost and the applicable tax and finally, display the total cost.

Standard shipping costs \$8, 2-day shipping \$16 and next day \$25. Customers get free standard shipping if their merchandise total is over \$75. The program displays the message, 'Invalid shipping option', if the input does not match one of the available shipping options.

The tax rate that should be used is four percent. Your program must exactly match these examples:

Example 1:

```
Order sub-total: 82.93
Select Shipping Speed: (S)tandard, (2)-Day, or (N)Next Day S
The total cost is: $86.25
```

Example 2:

```
Order sub-total: 43.29
Select Shipping Speed: (S)tandard, (2)-Day, or (N)Next Day E
Invalid shipping option.
```

Solution:

```
# Calculate total price at checkout online order

free_ship_over = 75
exempt_amount = 110
tax_rate = .04

subtotal = float(input("Order sub-total: "))
speed = input("Select Shipping Speed: (S)tandard, (2)-Day, or (N)Next Day ")

if speed == "S" or speed == "2" or speed == "N":
    if speed == "S":
        if subtotal > free_ship_over:
            ship_cost = 0
        else:
            ship_cost = 8.00
    elif speed == "2":
        ship_cost = 15.00
    elif speed == "N":
        ship_cost = 25
    total = subtotal + ship_cost
    total = total + total * tax_rate
```

```
    print("The total cost is: $" + str(round(total,2)) )  
else:  
    print("Invalid shipping option.")
```

4. (10 points) Discount Airlines, Inc. has asked you to write a Python program to help its customers calculate how many reward miles they have earned. Your program should ask the user how many flights they have taken and the distance (in miles) for each flight. Then your program will output the total number of miles flown and whether the customer achieved bronze (less than 20,000 miles flown) or silver (at least 20,000 miles flown) status.

Your output must exactly match the format of this example:

```
How many flights have you taken? 3
What was the distance of flight 1? 1000
What was the distance of flight 2? 5000
What was the distance of flight 3? 2000
You flew 8000 miles.
You earned bronze status.
```

Solution:

```
flights = int(input("How many flights have you taken? "))
total_distance = 0
for i in range(flights):
    distance = int(input("What was the distance of flight " + str(i + 1) + "? "))
    total_distance = total_distance + distance
print("You flew", str(total_distance), "miles.")
if total_distance < 20000:
    print("You earned bronze status.")
else:
    print("You earned silver status.")
```


5. (12 points) Write a program that generates a random integer between 1 and 50 (inclusive) and prints every number between 1 and 10 for which the randomly generated number is a multiple. The program should then ask the user to guess the number and output whether the guess was correct or incorrect as well as the actual number.

Your output must exactly match these examples:

Example 1:

```
The number is a multiple of 1
The number is a multiple of 5
The number is a multiple of 7
What is the number? 35
Correct, the number is 35
```

Example 2:

```
The number is a multiple of 1
The number is a multiple of 5
What is the number? 5
Incorrect, the number is 25
```

Solution:

```
import random

number = random.randint(1, 50)

for i in range(1, 11):
    if (number % i == 0):
        print("The number is a multiple of", i)

guess = int(input("What is the number? "))

if number == guess:
    print('Correct, the number is', number)
else:
    print('Incorrect, the number is', number)
```

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