Name: _____ Net ID: _____

NYU, Tandon School of Engineering
CS-1114: Introduction to Programming and Problem Solving — Spring 2017

CS-1114 – Midterm Exam

Tuesday, March 7, 2017

- You have one hour and 20 minutes.
- The exam has **TWO Parts**. The first part of the exam contains this cover page and a couple of pages for scratch work. **What you write in those pages will not be graded**, but you must hand it in with your exam.
- Write your Name and NetID at the head of each page.
- Write your answers clearly and concisely, in the spaces on the exam. Try to avoid writing near the edge of the page. **YOU MAY NOT USE THE BACKSIDE OF THE EXAM PAPERS**, as they will not be looked at. If you need extra space for an answer, use the **extra page at the end of the exam** and **mark it clearly**, so we can find it when we're grading.
- This is a closed-book exam. Calculators are not allowed.
- There are 5 questions all together, with 100 points total. Note that there is a longer programming problem at the end. Be sure to allow enough time for it.
- In all questions, you may assume that the user's inputs are as expected. That is, if the program expects a positive integer, you may assume that user will enter positive integers.
- Pay special attention to the style of your code. Indent your code correctly, choose meaningful names for your variables, choose most suitable control statements, etc.
- No need to document your code in this exam, but you may add comments if you think they are needed for clarity.
- **You may not use any Python constructs that were not shown in class.**
- Read every question completely before answering it.
- Cell phones, and any other electronic gadgets must be turned **off**.
- Do not talk to any students during the exam. If you truly do not understand what a question is asking, you may raise your hand when one of the CS1114 instructors is in the room.

Name: _____ Net ID: _____

Scratch
(This paper will not be graded)

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Question 1 (14 points)

Convert $(724)_{10}$ and $(2b1)_{16}$ to their binary representation.

$(724)_{10}$ = (_____)$_2$

$(2b1)_{16}$ = (_____)$_2$

Calculations:

_____

_____

_____

_____

Question 2 (21 points)

Consider the following variable definitions:

```
n = 6
s1 = "this is easy"
s2 = "abc"
```

Fill in the table with the type (`int`, `str`, `float`, `bool`) and the value of each expression.
If it's an invalid Python expression, put an X in the ERROR column instead of providing a type and value.

expression	type	value	ERROR
`n % 4`			
`n / 3`			
`n // 4`			
`s1[3]`			
`s1[3:9]`			
`s1 < "this is hard"`			
`(s2 + s2.upper()) * 2`			

Name: _____ Net ID: _____

Question 3 (20 points)
Given the following code:

```
x = int(input("Enter first value: "))
y = int(input("Enter second value: "))
if(x > 0):
    if(x > y  or y > x+2):
        print("First Message")
    if(not(x < 2)):
        print("Second Message")
    else:
        print("Third Message")
elif(x == 0 and y > 0):
    while(y >= 0):
        print("x =", x, "and y =", y)
        x += 1
        y -= 1
elif(x >= 2):
    print("Fourth Message")
else:
    print("Fifth Message")
```

What would be printed in each of the following two executions?

Execution 1:
Enter first value: 1
Enter second value: 4

Output:

Execution 2:
Enter first value: 0
Enter second value: 3

Output:

Name: _____ Net ID: _____

Question 4 (15 points)

What is printed when the following Python code is executed?

```
in_num = 5368
in_dig = 4
count = 0
go_on = True
while ((in_num > 0) and (go_on == True)):
    curr_digit = in_num % 10
    print(go_on, in_num, curr_digit, count)
    if (curr_digit < in_dig):
        go_on = False
    else:
        in_num = in_num // 10
        count += 1
if (go_on == True):
    print("yes")
else:
    print("no")
```

Output:

_____

_____

_____

_____

Name: _____

ID number: _____ Net ID: _____

Question 5 (30 points)

Write a program that computes how much a customer has to pay after purchasing an item in an electronics store.

The price is calculated according to the following rules:

- All customers get 10% off on small appliances: All items that have price less than $200, are considered small appliances (For example, if an item costs $188 it is a small appliance, but if an item costs $215 it is not).
- If the customer is a rewards club member, he or she also gets 25% off all other items (That is for items that cost at least $200).
- Tax is added: For NY residents 8.5% tax should be added. Residents of all other states pay 7% tax.

Inputs to the program include:

- Is the customer a rewards club member? (User enters 'Y' or 'y' for "yes"; 'N' or 'n' for "no").
- The item's price. **You may assume that it is a positive integer.**
- State of residence: Two letter abbreviation for state name (NY for New-York, NJ for New-Jersey, etc.)

Program displays:

- Price after discounts - the price after all applicable discounts (before tax is added).
- Tax – The amount of tax that has to be paid.
- Total price – total amount of money the customer has to pay (after tax).

It is OK if the program displays extra digits, such as $312.125

For example, these are two possible executions:

```
Is a rewards club member? (Y/N): N
Enter price of the item: 400
State of residence: NY
Price: $400
Tax:  $34.0
Total price: $434.0
```

```
Is a rewards club member? (Y/N): y
Enter price of the item: 400
State of residence: NJ
Price: $300
Tax:  $21.0
Total price: $321.0
```

Name: _____ Net ID: _____

Your program:

Name: _____ Net ID: _____

Name: _____ Net ID: _____

EXTRA PAGE IF NEEDED

Note question numbers of any questions or part of questions that you are answering here.
Also, write “ANSWER IS ON LAST PAGE” near the space provided for the answer.