

NYU – Tandon School of Engineering  
Brooklyn, NY 11201

# CS-UY 1114 / Python

First Midterm Exam – 22 October 2019

Name: \_\_\_\_\_

NetID(first part of email): \_\_\_\_\_

- Duration: 1 hour, 15 minutes
- **DO NOT WRITE ON THE BACK OF ANY PAGE!**
- Do not separate any page.
- **Please do not use pencil**, if you must, write darkly, these pages will be scanned
- If you write an answer other than in the space provided, please indicate in the space provided, where we can find that answer
- This is a closed book exam, no calculators are allowed
- You can expect that the user inputs the appropriate values (int/float/etc where required).
- Comments are not required
- Anyone found cheating on this exam will receive a zero for the exam.
- Anyone who is found writing after time has been called will receive a zero for this exam.
- Do not open this test booklet until you are instructed to do so.
- If you have a question please ask the proctor of the exam!
- Descriptive variable names are required
- Answers that are unnecessarily convoluted will result in a point deduction.
- You may use **ONLY** the following Python constructs and functions!

math operators: +, -, /, //, %, *, **	conditional statements: if, elif, else
boolean operators: and, or, not	loops: while and for <i>something</i> in range
all functions in modules random, turtle, and math	coercion functions: int, str, float
assignment operator (=) and augmented assignment operators: +=, -=, *=, /=, //=, %=, **=	print, input
comparison operators: ==, !=, <, <=, >, >=	

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**Question 1 (15 points; 2.5 points each):**

Given the following numbers, convert to decimal and hexadecimal as appropriate to complete all fields in the table:

Decimal (base 10)	Binary (base 2)	Hexadecimal (base 16)
100		
	1001011	
212		

**Question 2 (15 points):**

Trace the output of the following code. If you find an error, please write "ERROR," if you find an infinite loop, please write "INFINITE LOOP."

In your output, be sure visually represent any space with a `␣` character.

```
for i in range(1,5,2):
    for j in range(i+1, 10, 3):
        if j%2==0:
            continue;
        print("i=",i," j=",j);
```

Output:

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### Question 3 (15 points; 3pts each):

Given the following variables and values, print out the results of the following boolean expressions (in the result column, write “True”, “False” or “Error”)

`alpha = True`

`beta = True`

`gamma = False`

`delta= False`

Expression	Result
<code>alpha and beta and gamma</code>	
<code>gamma or beta and delta</code>	
<code>(alpha and beta) and (not beta or alpha)</code>	
<code>(beta and alpha) or (not gamma and beta)</code>	
<code>delta or (beta and alpha) or delta</code>	

### Question 4 (25 points):

We are designing an optical recognition system for a cheese manufacturing plant. The plant makes four types of cheeses “Cheddar,” “Feta,” “Swiss,” or “Gouda.” A camera will take a picture of a block of cheese and automatically measure the side lengths and angles of the block of cheese. The automated program will pass, to your program, the length of two adjacent sides (decimal real numbers) and two adjacent angles (always integers), you should output what type of cheese the block is.

For the purposes of this problem, you may use the following definitions

- A “Cheddar” block has two 90 degree angles and all sides are the same length
- A “Feta” block has two 90 degree angles and two adjacent sides have different lengths
- A “Swiss” block has adjacent sides with different lengths and the sum of the two adjacent angles is not 180 degrees but the block is not Feta.
- A “Gouda” block has adjacent sides with the same length and the sum of the angles is 180 degrees but the block is not Cheddar.

What is the length of side 1:10 What is the first angle:90 What is the length of side 2:10 What is the second angle:90 CHEDDAR	What is the length of side 1:5 What is the first angle:90 What is the length of side 2:10 What is the second angle:90 FETA
What is the length of side 1:10 What is the first angle:90 What is the length of side 2:5 What is the second angle:30 SWISS	What is the length of side 1:10 What is the first angle:50 What is the length of side 2:10 What is the second angle:130 GOUDA
What is the length of side 1:10 What is the first angle:30 What is the length of side 2:5 What is the second angle:150 Not sure	What is the length of side 1:10 What is the first angle:120 What is the length of side 2:10 What is the second angle:120 Not sure

(Please start your answer on page 4)

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Solution to Question 4:

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(Additional space for Question 4)

**Question 5 (30 points):**

A digital cash register totals an amount that a person should pay based on what they purchase in the store. Our items are simple, but we have some special sales that need to be addressed in the software that totals the amount a customer should pay. You should write a program that asks the user what product they purchased (all of our products are single letter items) and when the user enters a zero, print on the screen, the total amount due.

Item code	Price	Special
A	\$1.75	Buy one, get one free
B	\$2.25	(none)
C	\$4.00	Half price if customer also purchased "B"

- Note: Item A is full price if the customer only purchases one. The second one is free. Also note that the customer could buy more than 2, in which case all additional items are paired (1= \$1.75, 2= \$1.75, 3 = \$3.50, 4=\$3.50, etc)
- Note: Any number of Item C are half price (\$2.00) if the customer purchases item B. The purchase of B doesn't have to appear first, it may come after the customer purchases C in which case the cost of C should be reduced appropriately.
- Note: the user will only, ever, input the letters A,B,C, or the number 0.

Please make your program look exactly as below:

Welcome to the cash register Which item?A Which item?A Which item?0 Your total is: 1.75	Welcome to the cash register Which item?B Which item?C Which item?0 Your total is: 4.25
Welcome to the cash register Which item?C Which item?C Which item?B Which item?0 Your total is: 6.25	Welcome to the cash register Which item?A Which item?A Which item?A Which item?C Which item?0 Your total is: 7.5

(Please start your answer on page 7)

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Solution to Question 5:



Name \_\_\_\_\_

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(Additional space for Question 5)

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(SCRAP)