CIS 3260 – Midterm Exam

Your Name:_____

Your Panther ID: _____

Part 1 – Multiple Choices [30 points]

1) [2 points] Why do computers use zeros and ones?
   A. because combinations of zeros and ones can represent any numbers and characters.
   B. because binary numbers are the bases upon which all other number systems are built.
   C. because digital devices have two stable states and it is natural to use one state for 0 and the other for 1.
   D. because binary numbers are simplest.

2) [2 points]Computer can execute the code in _____.
   A. high-level language
   B. assembly language
   C. machine language
   D. none of them

3) [2 points] _____ is a program that runs on a computer to manage and control a computer's activities.
   A. Software
   B. Operating system
   C. Python
   D. Compiler
   E. Interpreter

4) [2 points] Which of the following statements is true?
   A. Python 3 is a newer version, but it is not backward compatible with Python 2.
   B. A Python 3 program can always run on a Python 2 interpreter.
   C. Python 3 is a newer version, but it is backward compatible with Python 2.

5) [2 points] Which of the following code is correct?
   A.
```
print("Programming is fun")
                print("Python is fun")
```
   B.
```
print("Programming is fun")
print("Python is fun")
```
   C.
```
    print("Programming is fun)
      print("Python is fun")
```
   D.
```
print("Programming is fun)
print("Python is fun")
```

6) [2 points] Suppose you write a program for computing the area of a rectangle and you mistakenly write your program so that it computes the perimeter of a rectangle. What kind of error is this?
   A. runtime error

B. syntax error
C. logic error

7) [2 points] What is **x** after the following statements?

```
x = 2
y = 1
x *= y + 2
```

A. x is 3
B. x is 4
C. x is 5
D. x is 6

8) [2 points] What is the output of the code below if **number** is 4?

```
if number % 2 == 0:
    print(number, "is even.")

print(number, "is odd.")
```

A. 4 is even
   4 is odd

B. 4 is even

C. 4 is odd

D. 4 is even
   4 is even

9) [2 points] The following code displays _____.

```
temperature = 30

if temperature >= 100:
    print("too hot")
elif temperature <= 40:
    print("too cold")
else:
    print("just right")
```

A. too hot
B. too cold
C. just right
D. too hot too cold just right

10) [2 points] To check if x has an absolute value smaller(less) than 5, which of the following conditional expression can be used?

A. x < 5 and x > -5
B. x <= 5 and x > -5
C. x < 5 and x > -5
D. x < 5 or x > -5

11) [2 points] Suppose **isPrime** is a boolean variable, which of the following is the CORRECT and SHORTEST statement for testing if **isPrime** is true.

A. if isPrime = True:
B. if isPrime == True:
C. if isPrime:
D. if not isPrime = False:
E. if not isPrime == False:

12) [2 points] Suppose **income** is 5000, what will be displayed by the following code?

```
if income > 3000:
    print("Income is greater than 3000")
elif income > 4000:
    print("Income is greater than 4000")
```

A. none
B. Income is greater than 3000
C. Income is greater than 3000 followed by Income is greater than 4000
D. Income is greater than 4000
E. Income is greater than 4000 followed by Income is greater than 3000

13) [2 points] Python is case sensitive?
A. YES
B. No

14) [2 points] The not equal comparison operator is
A. <>
B. !=
C. ==
D. =

15) [2 points] _____ are instructions to the computer.
A. Hardware
B. Software
C. Keyboards

Part 2 – Fill in blanks [20 points]

1) [9 points] What are the results for following expressions in Python?

Assume x=4, y=3, z=5

(1) x < y and y < z _____
(2) not (z < y) _____
(3) x < y < z _____

```
(4)    x % 2 == 0          _____________
(5)    x % 2 == 0 or z % 5 == 0    _____________
(6)    7/5                 _____________
(7)    7//5                _____________
(8)    7%5                 _____________
(9)   2 ** 3               _____________
```

2) [3 points] Write a single-line **print statement** to display the result of following expression.

$$2 * (\frac{1}{3} + 2.5)^5$$

print statement: _____

3) [3 points] Assume x is an integer. Write a simple **Boolean expression** as a condition to check if x is not multiple of 5.

Boolean expression: _____

4) [5 points] Clunker Motors Inc. is recalling all vehicles from model years 1995-1999 and 2004-2008. Given a variable **modelYear**, write a simple **Boolean expression** as a condition to check if the value of **modelYear** does fall within either of the two recall ranges or not.

Boolean expression: _____

Part 3 – Software Development [50 points]

1) [14 points]

Given an airplane's acceleration a and take-off speed v, you can compute the minimum runway length needed for an airplane to take off using the following formula:

$$length = \frac{v^2}{2a}$$

Write a program that prompts the user to enter v in meters/second (m/s) and the acceleration a in meters/second squared (m/s2), and displays the minimum runway length.

Sample Run

```
Enter speed: 55.5
Enter acceleration: 3.5
The minimum runway length for this airplane is
440.0357142857143 meters
```

A. [3 points] System Analysis: What is(are) the input(s) and output(s)?

B. [4 points] System Design: List the steps to get output(s) from input(s)

C. [7 points] Write your program and put your source code here.

2) [18 points] Write a program that prompts the user to enter the currency exchange rate between U.S. dollars and Chinese Renminbi (RMB). Prompt the user to enter 0 to convert from U.S. dollars to Chinese RMB and 1 for vice versa. Prompt the user to enter the amount in U.S. dollars or Chinese RMB to convert it to Chinese RMB or U.S. dollars, respectively. Here are some sample runs:

amountDollar = amountRMB/rate
amountRMB = amountDollar *rate

Sample Run 1

```
Enter the exchange rate from dollars to RMB: 6.81
Enter 0 to convert dollars to RMB and 1 vice versa: 0
Enter the dollar amount: 100
100.0 dollar is 681.0 yuan
```

Sample Run 2

```
Enter the exchange rate from dollars to RMB: 6.81
Enter 0 to convert dollars to RMB and 1 vice versa: 1
Enter the RMB amount: 10000
10000.0 yuan is 1468.43 dollar
```

Hints: An input statement could also be conditionally executed.

A. [3 points] System Analysis: What is(are) the input(s) and output(s)?

B. [4 points] Assume you would like to use TWO way selection statement. What should be the condition(describe it in English)? How to represent it using a Boolean expression (may use logical operator) in Python?
Note: We assume user's input for option (0 or 1) has been stored into a variable **choice**

C. [4 points] System Design: List the steps to get output(s) from input(s)

D. [7 points] Write your program and put your source code here.

3) [18 points] Write a program that prompts the user to enter two characters and displays the status and major represented in the characters. The first character is number 1, 2, 3, and 4, indicating whether a student is a freshman, sophomore, junior, or senior; the second character indicates the major. Suppose the following characters are used to denote the majors:

C: Computer Information Systems
F: Finance

Sample Run 1

```
Enter First Character: F
Enter Second Character: 1
Finance
Freshman
```

Sample Run 2

```
Enter First Character: C
Enter Second Character: 2
Computer Information Systems
Sophomore
```

A. [3 points] System Analysis: What is(are) the input(s) and output(s)?

B. [4 points] Assume you would like to use MULTIPLE way selection statement. What should be the condition to check if the input is for a ***senior in Computer Information Systems*** (describe it in English)? How to represent it using a Boolean expression (may use logical operator) in Python?
Note: We assume user's inputs for first character is stored into variable **c1**, for second character is stored into variable **c2**.

C. [4 points] System Design: List the steps to get output(s) from input(s)

D. [7 points] Write your program and put your source code here.