Desk Number _____

Student Number _____

Student Name _____

School of Science and Engineering

MIDTERM EXAMINATION

Semester 1, 2021

CSC1001 Introduction to Computer Science

Examination Duration: 120 minutes

Reading Time: 10 minutes

This examination has __3__ questions.

Exam Conditions:

This is a FORMAL Examination

This is a RESTRICTED OPEN BOOK Exam. Maximum of one (1) sheet of handwritten notes double sided are permitted

Materials Permitted In The Exam Venue:

Maximum of one (1) sheet of handwritten notes double sided are permitted. **NO OTHER MATERIALS PERMITTED**

Any calculators without the functionalities of programming and file storage are permitted.

Materials To Be Supplied To Students:

1 × 12 Page Answer Booklet

Question 1. (10 × 3% = 30%)

Pick the correct option in each of the following sub-questions. Note that only ONE option is correct.

1.1) Which of the following statement is true?

A. Modern computers can only process binary data in the low level. -

B. The computers based on Von Neumann architecture are rarely seen nowadays.

C. Computers cannot work without an operating system.

D. The arithmetic/logic unit (ALU) in the Von Neumann architecture is used to fetch commands from the memory.

1.2) Hexadecimal number FF.CC equals to binary number:

A. 11111111.111111

B. 11111111.110011 .

C. 11111111.001111

D. 11111111.0011

1.3) Concerning the information unit, which of the following statement is incorrect?

A. 1GB = 1024MB.

B. Byte is the smallest information unit in computer programming. ▪

C. 1 MB = 1024 KB.

D. 1 TB = 2^{40} bit

1.4) Concerning programming languages, which of the following is correct?

A. As a high-level language, Python can be executed without being translated into low-level languages.

B. High-level languages allow the programmer to code in a relatively easy and fast way. ▪

C. Low-level languages have higher development efficiency.

D. Assembly language is a kind of machine language.

1.5) Which of the following codes in Python will raise an error?

A. _count = 1

B. print = 1.5

C. $pi = 3.14 .

D. #a = &pi

1.6) What is the output of the following Python program?

```
1. a = -2
2. b = 3
3. print(a % b ** b)
```

A. 25 B. 1 C. 8 D. -2

1.7) What is the output of the following program?

```
1. strs = ['PYTHON', 'JAVA']
2. for index in range(len(strs)):
3.     strs.append(strs[index].lower())
4. print(strs)
```

A. [‘PYTHON’, ‘JAVA’, ‘python’, ‘java’]

B. [‘python’, ‘java’]

C. [‘PYTHON’, ‘JAVA’]

D. None of the above, because the loop would not stop.

1.8) The following Python program wants to calculate the sum of 1, 2, 3, 4, and 5, how many errors are there in the program?

```
1. arr_strs = '1,2,3,4,5'
2. index = 0
3. sums = 0
4. while index < len(arr)
5.       sums = sums + int(arr_strs[index])
6.       index += 1
7. print(sums)
```

A. 1 B. 2 C. 3 D. 4

1.9) What is the output of the following Python program?

```
1. s = "ball"
2. r = ""
3. for item in s:
4.       r = item.upper() + r
5. print(r)
```

A. Ball B. LLAB C. BALL D. TypeError

1.10) What would list_transformation([0, -2, 5.2, 1]) return?

```
1. def list_transformation(lst):
2.     lst.sort()
3.     sum_of_lst = sum(lst)
4.     lst.append(sum_of_lst)
5.     return lst
```

A. [-2, 0, 1, 4.2, 5.2] B. [-2, 0, 1, 5.2, 4.2]

C. [4.2, -2, 0, 1, 5.2] D. [0, -2, 5.2, 1, 4.2]

Question 2. (10 × 4% = 40%)

Pick the correct option/s in each of the following sub-questions. Note that there may be MULTIPLE correct options for each sub-question.

2.1) Which of the following types is/are immutable? int, float, bool, str, tuple, and Unicode

A. Strings

B. Lists

C. Tuples

D. Dictionaries

2.2) Concerning the following program, which of the following statements are correct?

```
1. a = int('123')
2. print(a)
3. b = '12.3'
4. print(float(b))
5. c = int('5C.6B')
6. print(c)
```

A. All three print() statements will output a number.

B. After the program has been executed, variable a is of integer type.

C. After the program has been executed, variable b is of float type.

D. Function int() is used for data type conversion.

2.3) The following 4 options show 4 statements and their outputs; in which option(s) the output is (are) correct?

A. Statement:

```
1. s = 60
2. if s >= 60 and s < 70:
3.     print('pass')
```

Output: pass

B. Statement:

```
1. def swap(a, b):
2.     a, b = b, a
3.     return a, b
4. a = 1
5. b = 2
6. swap(a, b)
7. print(a, b)
```

Output: 2, 1

C. Statement:

```
1. counter = 1
2. sum = 0
3. while counter <= 6:
4.     sum = sum + counter
5.     counter = counter + 2
6. print(sum)
```

Output: 9

D. Statement:

```
1. for letter in 'Python':
2.     if letter == 'h':
3.         continue
4.     print(letter, end='')
```

Output: Pyt

2.4) Concerning the following program, which statements are correct?

```
1. str1 = "a" + 'b'
2. str2 = '2*2'
3. str3 = 'ac'
4. print(str1+int(str2)*str3)
```

A. The output is ab2*2ac.

B. The output is abacacacac.

C. If "int" in line 4 is changed into eval, the output is abacacacac.

D. The program will raise an error.

2.5) Concerning the following program, which of the following statements are incorrect?

```
1. def test(a, b, c):
2.     a = 2
3.     b[1] = 2
4.     c *= a
5.     print(a, ',', b, ',', c)
6. a = 1
7. b = [0, 1]
8. c = "2"
9. test(a,b,c)
10. print(a, ',', b, ',', c)
```

A. The output of the print() in line 5 is "2 , [0, 2] , 22". (Not include the quotation mark.)

B. The output of the print() in line 10 is "2 , [0, 2] , 22". (Not include the quotation mark.)

C. The output of the print() in line 10 is "1 , [0, 2] , 2". (Not include the quotation mark.)

D. The output of the print() in line 10 is "2 , [0, 1] , 2". (Not include the quotation mark.)

2.6) Concerning the following program, which of the following statement(s) is (are) true?

```
1.  x = 0
2.  def func1():
3.      x = 2
4.  def func2():
5.      global x
6.      print(x)
7.      func1()
8.      print(x)
9.  x = 1
10. func2()
```

A. The output of the first print() is 0.

B. The output of the first print() is 1.

C. The output of the second print() is 1.

D. The output of the second print() is 2.

2.7) Which of the following statement will output True?

A. >>> ‘a’ in [‘b’, ‘a’, ‘n’, ‘a’, ‘n’, ‘a’]

B. >>> ‘key1’ in {'key1': 1, 'key2': 2}.items()

C. >>> 'umbrella'.find('e') == 4

D. >>> "abcdefg"[1:4] == 'bcde'

2.8) Concerning the following program, which of the following statement(s) is (are) true?

```
1.  L1 = [0.34, '6', 'SI106', 'Python', -2]
2.  print(len(L1[1:-1]))
3.  L2 = [1,2,3,4,5]
4.  for i in range(len(L2)-1, -2, -1):
5.      print(L2[i], end=' ')
```

A. The output of the first print() is 3.

B. The output of the first print() is 4.

C. The output of the second print() is 5 4 3 2 1.

D. The output of the second print() is 5 4 3 2 1 5.

2.9) Which command below closes the already open file “myText.txt” if the following code has already been written?

```
1.  ref_file = open("myText.txt", "r")
```

A. "myText".close()

B. ref_file.close()

C. close(ref_file)

D. close("myText.txt")

2.10) Concerning the following program:

```
1.  nums = []
2.  while 1:
3.      input_value = input('Enter a number:')
4.      if input_value == 'done': break
5.      value = float(input_value)
6.      nums += [value]
7.      average = sum(nums) / len(nums)
8.      print('The average is: ', average)
```

Which of the following statements are correct?

A. The purpose of this program is to calculate the average of your inputted numbers.

B. This program uses a definite loop to ask the user to input some numbers.

C. The list “nums” stores all your keyboard input numbers.

D. Line 6 is used to add the inputted number the summation.

Question 3. (5% + 15% + 10% = 30%)

3.1) Answer the following questions:

(a) Please draw the figure of Von Neumann Architecture. (3 marks)

(b) After editing Python script in a source file name “main.py”, how to tell your computer to execute the python script in command line? (2 marks)

3.2) Consider the following programs and answer the questions.

(a)

```
1.  try:
2.      result = 20 / int(input('Please input a number:'))
3.      print(result)
4.  except ValueError:
5.      print('You must input an integer.')
6.  except ArithmeticError:
7.      print('You cannot input 0.')
8.  else:
9.      print('No error')
```

What is the output if you enter the number 1.5 after the running program requires you to input? What if you enter 0? And what about entering 10? (6 marks)

1.5 then the output is 'you must input an integer'
0 then the output is 'you cannot input 0.'
10 then the output is 2 and no error

(b)

```
1.  word = "incomprehensible"
2.  d = dict()
3.  for char in word:
4.      if char not in d:
5.          d[char] = 1
6.      else:
7.          d[char] = d[char] + 1
8.  print(d.get('d', 0))
```

Write down the outputs of this program. (4 marks)

0

(c)

```
1.  a = 5
2.  e = a // 2
3.  for i in range(-e, e+1):
4.      j = abs(i)
5.      strs = ""
6.      for k in range(e-j): strs += " "
7.      for k in range(j * 2 + 1): strs += "*"
8.      print(strs)
```

Write down the outputs of this program. (5 marks)

```
*****
 ***
  *
 ***
*****
```

3.3) Concerning the following program:

```
1.  Dict = {'Mike': 15, 'John': 20, 'Amy': 19, 'Brain': 18}
2.  s = list(Dict.items())
3.  list1 = []
4.  list2 = list()
5.  for i in range(len(s)):
6.      list1.append(((s[i])[0], (s[i])[1]))
7.      list2 += [((s[i])[1], (s[i])[0])]
8.  print(list1)
9.  print(list2)
10. list3 = sorted(list1)
11. list4 = sorted(list2)
12. print(list3)
13. print(list4)
```

```
[('Amy', 19), ('Brain', 18), ('John', 20), ('Mike', 15)]
[(15, 'Mike'), (18, 'Brain'), (19, 'Amy'), (20, 'John')]
```

Answer the following questions:

A. What are the outputs of the last two print()? (3 marks)

B. How many elements are there in list1 and list3? (2 marks)

C. What are the data types of elements in list1 and list3? (2 marks)

D. What are the outputs of the first two print() if we change the code in line 3 and line 4 to the code below? Please explain your judgment briefly. (3 marks)

```
[('Mike', 15), (15, 'Mike'), ('John', 20), (20, 'John'),
('Amy', 19), (19, 'Amy'), ('Brain', 18), (18, 'Brain')]
```

list1 = list2 = []

END OF EXAMINATION