Desk Number_____

Student Number_____

Student Name_____

School of Science and Engineering
MIDTERM EXAMINATION

Semester 2, 2019

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

Materials To Be Handed in After Exam:

After exam, only answer sheet for multiple choice questions and the answer booklet are to be handed in.

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Question 1. (10 × 3% = 30%)

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

1. Which of the following is NOT a part of the Von Neumann architecture?

   A. central processing unit   B. graphical processing unit

   C. main memory   D. output device

2. Assume that before time = 1, the voltage level is positive. Then the signals shown in the following figure can be translated into NRZI code

Figure 1

   A. 1101101001   B. 0110110001   C. 1001001110   D. 0101101001

3. Which of the following is NOT a high-level programming language?
   A.C++ language   B. Java language   C. Assembly language   D. Python

4. Concerning programming languages, which of the following is incorrect?

   A. Assembly language is also called machine language.

   B. Lower level languages have higher language efficiency.

   C. Higher level languages have higher development efficiency.

   D. High level languages cannot be executed directly, and it must be converted into low-level languages first.

5. Binary number 100011.011 equals to decimal number

   A. 35.75   B. 35.375   C. 70.75   D. 70.375

6. Decimal number 135 equals to the binary number as

   A. 10000111   B. 10001001   C. 10000110   D. 10001111

7. What is the output for the following codes:

```python
def func(n):
    if n==1:
        return 1
    if n==2:
        return 2
    return func(n-1)+func(n-2)
print(func(5))
```

A. 6   B. 7   C. 8   D. 10

8. Concerning Python variables, which of the following is incorrect?

A. A variable is a named space in the memory.

B. The value of a variable can be changed later in a program.

C. Variable names can only contain letters, numbers and underscore.

D. Variable names are case insensitive.

9. What is the output of the following program?

```python
y=2019
b=16
s=y//b**2+y%b**2//b+y%b
print(s)
```

A. 24   B. 12   C. 15879   D. 255

10. What is the output of the following program?

```python
def product(a, b):
    return a*b
def add(a, b):
    return a+b
def difference(a, b):
    return b-a

a=0
b=2
print(b>0 and b<3)
print(b==0 or b>3)
if not b:
    print(product(a, b))
elif a:
    print(add(a, b))
else:
    print(difference(b, a))
```

A. True	B. False	C. True	D. Error
False	False	False	
-2	0	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(one, two, three or four correct options all possible). With any wrong options will get 0 point for that problem, while missing any correct options will get half(2 points).

11. Concerning Python data types, which of the following statement/s is /are incorrect?

   A. The data type of an object can be checked using type() function.

   B. The result of '1'+'2' is '3'.

   C. Once a variable is created, the type of it cannot be changed during program execution.

   D. If a variable is reassigned to a new value, this variable's type is determined by the value that is first assigned to it.

12. Concerning the following program, which of the following statement/s is/are correct?

```
a=str(123)
print(a)
b=int(45.67)
print(b)
c=float('89')
print(c)
```

   A. All three print() statements will output a number (either integer or float type).

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

   C. After the program has been executed, variable b and c are of integer type.

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

13. The following 4 options show 4 statements and their outputs; in which option/s the output is/are correct?

   A. Statement:
```
print(str(1+2+3))
```
   Output:
   '1+2+3'

   B. Statement:
```
a='I love Python!! And you?'
print(a.split('!')[1])
```
   Output:
   'And you?'

   C. Statement:
```
a=list(range(4))
for i in a:
    for j in range(a[i]+1,len(a)):
        if j==3:
            continue
        print(j,end='')
```
   Output:
   122

   D. Statement:
```
a='Hallo!'
a[1]='e'
print(a)
```
   Output:
   'Hello!'

14. Concerning the following program, which statement/s is/are correct?

```
s1='abc'
s2=' '*3
s3='123'
print(s1+s2+s3)
print(s1*s2*s3)
print(s1*2+s2*2+s3*2)
```

(Suppose three print() statements are executed separately.)

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

       abc   123

    B. The output of the second print() statement is

       123   abc

    C. The output of the third print() statement is

       abcabc   123123

    D. The output for the third print() statement is;

       abc abc   123 123

15. Concerning the following program, which of the following statement/s is/are incorrect?

```
a=1
b=2
if a==b:
    print('Same')
    else:
    print('Different')
print('Finished')
```

    A. This program will give a syntax error.

    B. This program will output a string 'Different'.

    C. This program contains a two-way decision statement.

    D. This program will output a string 'Finished'.

16. Which of the following statement/s is/are incorrect?

    A. eval() function is used to calculate a number expression, for example eval(2*3+1).

    B. We can execute the instruction print(sin(pi/2)) after we execute import math.

    C. We can open and modify a file by open('filename','r').

    D. Python can use variables without declaration.

17. Concerning the following two programs:

```
n=5
while n>0:
    print('Lather')
    print('Rinse')
n=n-1
print('Dry off!')
```

```
n=0
while n>=0:
    print('Lather')
    print('Rinse')
    n=n-1
print('Dry off!')
```

Which of the following statement/s is/are correct?

A. Both programs will NOT cause syntax errors.

B. The while loop in the first program will execute 5 iterations.

C. The while loop in the second program will execute 0 iteration.

D. The output of the second program is:

```
Lather
Rinse
Dry off!
```

18. Concerning for loop and the following program

```
smallest_so_far=None
print('Before',smallest_so_far)

for num in [9,39,21,98,4,5,100,65]:
    if smallest_so_far==None:
        smallest_so_far=num
    elif num<smallest_so_far:
        smallest_so_far=num
    print(smallest_so_far,num)

print('After',smallest_so_far)
```

Which of the following statement/s is/are incorrect?

A. for loop is a definite loop in the sense that its iteration number is set beforehand.

B. for loop can only be used to iterate every element of a list.

C. The output of the above program is

```
Before None
9 9
9 39
9 21
9 98
4 4
4 5
4 100
4 65
After 4
```

D. If, instead of None, the value of smallest_so_far is set to be a number larger than the first element of the list, the program won't give the smallest number in the list.

19. Concerning the following program

```python
def greet(lang):
    if lang=='es':
        return 'Hola'
    elif lang=='fr':
        return 'Bonjour'
    else:
        return 'Hello'

print(greet('en'),'Glenn')
print(greet('es'),'Sally')
print(greet('fr'),'Michael')
```

➡

```
Hello Glenn
Hola Sally
Bonjour Michael
```

Which of the following statement/s is/are correct?

A. lang is an argument of function greet().

B. Function greet() has only one explicit parameter.

C. Function greet() has only one return value.

D. If you execute the statement greet('abc') in a .py file, it will print out string 'Hello' on the screen.

20. Concerning the following program

```python
numlist=list()
while True:
    inp=input('Enter a number:')
    if inp=='done':break
    value=float(inp)
    numlist.append(value)

average=sum(numlist)/len(numlist)
print('The average is:',average)
```

Which of the following statement/s is/are correct?

A. The only way to break the loop is to enter 'done' as an input.

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

C. The length of the list numlist has not been set beforehand.

D. The elements in numlist have no order.

Question 3. (6% + 14% + 10% = 30%)

Read the following programs and answer the corresponding questions. Please write all your answers for this part on the answer booklet.

3.1) Concerning the following program

```
myTextOne='abcd*efg abc**defg*hij'
myTextTwo='1234 567/89'
myText=myTextOne+myTextTwo

wordsOne=myText.split()
wordsTwo=wordsOne[1].split('*')

print(wordsOne[2])
print(wordsOne[2][3])
print(wordsTwo[0])
print(wordsTwo[2][3])
```

What are the outputs of this program?

3.2) Read the following programs to answer the questions below:

```
i=2
while i<100:
     j=2
     while j<=i/j:
          if not i%j:break
          j=j+1
     if j>i/j:print(i,'is prime number')
     i=i+1
print('Good bye!')
```
a.

```
for num in range(10,20):
     flag=True
     for i in range(2,num):
          if num%i==0:
               j=num/i
               print(('%d is %d * %d')%(num,i,j))
               flag=False
               break
     if flag:
          print(num,'is a prime')
```
b.

1) Please write down the first five outputs of program a.
2) How many iterations does program b execute?
3) Please list out the first three outputs of program b.
4) If we change the second line of program b as
```
for i in range(3,num):
```
please list out the new first three outputs.

3.3)   Concerning the following program

```python
myDict={'apple':10,'banana':8,'orange':15,'pear':12}
mySeq=myDict.items()

newList1=list()
newList2=list()

for key,val in mySeq:
    newList1.append((key,val))
    newList2.append((val,key))

print('The list sorted by keys:')
print(sorted(newList1))
print('The list sorted by values:')
print(sorted(newList2))
```

Answer the following questions:

1) What is the data type of elements in lists newList1 and newList2?
2) How many elements are there in newList1?
3) Has the function sorted() modified the list it sorts?
4) What are the outputs of this program?

END OF EXAMINATION