Desk Number \_\_\_\_\_\_\_\_

Student Number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**School of Science and Engineering**

**MIDTERM EXAMINATION**

Semester 1, 2023

**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 printed or handwritten notes double sided are permitted.

A paper dictionary is permitted.

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

**NO OTHER MATERIALS 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 is a correct statement about Von Neumann, modern computers, and the operating system? B 易

A) Von Neumann was the inventor of the operating system, which is a critical part of modern computers.

B) Von Neumann's architecture laid the foundation for modern computers, and the operating system is a low-level program that provides all basic services for managing and controlling a computer’s activities.

C) Von Neumann's work has no influence on modern computers, and the operating system is solely a product of hardware evolution.

D) Modern computers were developed independently of John von Neumann's ideas, and the operating system emerged much later.

1.2) Suppose the voltage signal is at the low level initially, the signals shown in the following figure can be translated into NRZI code as: C 易



A) 001111011 B) 110000100 C) 101000110 D) 010111001

1.3) Convert the decimal number 29.375 to its hexadecimal, binary, and octal representations. What are the results? A 易

A) Hexadecimal: 1D.6, Binary: 11101.011, Octal: 35.3

B) Hexadecimal: 1D.4, Binary: 11101.010, Octal: 35.2

C) Hexadecimal: 1D.8, Binary: 11101.100, Octal: 35.4

D) Hexadecimal: 1D.5, Binary: 11101.001, Octal: 35.1

1.4) What is the decimal value of the binary number 1101.101010? C 易

A) 13.84375 B) 11.67185 C) 13.65625 D) 12.61875

1.5) What is the smallest unit of information used in computers? B 易

A) Byte B) Bit C) Kilobit D) Gigabyte

1.6) Which of the following statements is correct? D 易

A) An assembly language is a high-level programming language.

B) Low-level languages are more user-friendly and easier to learn than high-level languages.

C) The operating system is a high-level program which provides all basic services for managing and controlling a computer’s activities.

D) High-level languages are less efficient in terms of execution speed compared to low-level languages.

1.7) Which of the following codes in Python will raise an error? C 中

A) \_\_age\_\_ = 24

B) first\_name = "John"

C) 2nd\_name = "Doe"

D) # day =+ 1

1.8) What is the output of the following Python program? B 易

4 \* 3 // 2 + 7 % 5 - 2 \*\* 3

A) 6 B) 0 C) -5 D) -2

1.9) Which of the following methods is used to open a file in Python for reading, assuming that the file already exists? B 易

A) write() B) open() C) read() D) create()

1.10) What will be the output of the following Python code? A 易

1. a = 10
2. **def** my\_function(a, b=5):
3. c = a \* b
4. **return** a + b, c
5. result1, result2 = my\_function(5, 3)
6. **print**("Result 1: ", result1)
7. **print**("Result 2: ", result2)

A)

Result 1: 8

Result 2: 15

B)

Result 1: 13

Result 2: 30

C)

Result 1: 10

Result 2: 25

D)

Result 1: 15

Result 2: 50

**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 codes in Python will raise an error? AC

A)

1. s = 'abc'
2. s[1] = "d"

B)

1. dict\_1 = {'a': 1, 'b': 2}
2. dict\_2 = dict\_1
3. dict\_2['a'] = 3

C)

1. s = ('a', 'b', 'c')
2. s[1] = 'd'

D)

1. s = ["a", "b", "c"]
2. s[1] = 'd'

2.2) Concerning the following program, which of the following statement(s) is/are correct? BD 易

1. a = float('17')
2. b = int(a)
3. c = int('39.f')
4. **print**(a)
5. **print**(b)
6. **print**(c)

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

B) After the program has been executed, variable `a` is of float type;

C) After the program has been executed, variable `c` is of integer type;

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

2.3) Concerning the following program, which statement(s) is/are incorrect? BC 易

text = "Hello, World!"

A) You can access individual characters in the 'text' string using indexing.

B) The length() function can be used to find the length of 'text' string.

C) You can modify the characters in the 'text' string using indexing directly.

D) The `replace()` method can be used to replace a substring with another in the 'text' string.

2.4) Which of the following statement(s) is/are correct? AB 易

1. # Code for question A:
2. output1 = []
3. num = 0
4. **while** num < 5:
5. output1.append(num)
6. num += 1
7. **if** num == 3:
8. **break**
9. numbers = [1, 2, 3, 4, 5]
10. # Code for question B:
11. output2 = []
12. **for** num **in** numbers:
13. **if** num % 2 == 1:
14. output2.append(num)
15. # Code for question C:
16. output3 = []
17. **for** num **in** numbers:
18. **if** num > 3:
19. **break**
20. output3.append(num)
21. # Code for question D:
22. output4 = []
23. **for** num **in** range(4):
24. output4.append(num)

A) The output1 after the loop is [0, 1, 2]

B) The output2 after the loop is [1, 3, 5]

C) The output3 after the loop is [4, 5]

D) The output4 after the loop is [1, 2, 3]

2.5) Which of the following is/are valid string methods in Python? AC 易

A) split() B) reverse() C) find() D) remove()

2.6) Concerning the following program, which of the following statement(s) is/are correct? AD易

1. **def** outer\_function():
2. x = 10
3. **def** inner\_function():
4. y = 5
5. inner\_function()
6. z = x + y
7. outer\_function()

A) Variable x is accessible in both outer\_function and inner\_function.

B) Variable y is accessible in outer\_function.

C) Variable z is accessible in inner\_function.

D) Line 6 will raise an error due to an undefined variable `y`.

2.7) Which of the following statement(s) is/are correct? AC 易

1. str1 = '1  3  5  7  9  11'
2. lst1 = str1.split(' ')
3. **print**(len(lst1[2:5]))  # 1
4. str2 = "my name is x"
5. **print**(str2[3])  # 2
6. **for** i **in** str2.split():
7. **print**(i, end=", ")  # 3

A) The output of the first print(): 3

B) The output of the second print(): name

C) The output of the third print(): my, name, is, x,

D) The output of the third print(): m, y, n, a, m, e, i, s, x,

2.8) Which of the following statement(s) is/are correct? AD 中

1. my\_list = [1, 2, 3, 4, 5]
2. my\_string = "PythonProgramming"

A) my\_list[2:4] will result in [3, 4].

B) my\_string[1:9] will result in "yhnrg".

C) my\_list[2:7] will result in "tho".

D) my\_list[:2] will result in [1, 2].

2.9) Which of the following statements are correct regarding the tuple `my\_tuple`? BD 中

my\_tuple = (1, 2, 3, 4, 5)

A) Tuples are mutable, so you can change the value of an element in `my\_tuple`.

B) You can access the second element of `my\_tuple` using my\_tuple[1].

C) You can add a new element to `my\_tuple` using the append() method.

D) You can concatenate `my\_tuple` with another tuple using the `+` operator.

2.10) Which of the following statements are true? ACD 易

A) Lists and dictionaries are mutable, meaning their contents can be changed after they are created.

B) Strings are mutable, allowing individual characters to be modified using indexing.

C) Dictionaries store data in key-value pairs, allowing efficient look-up based on keys.

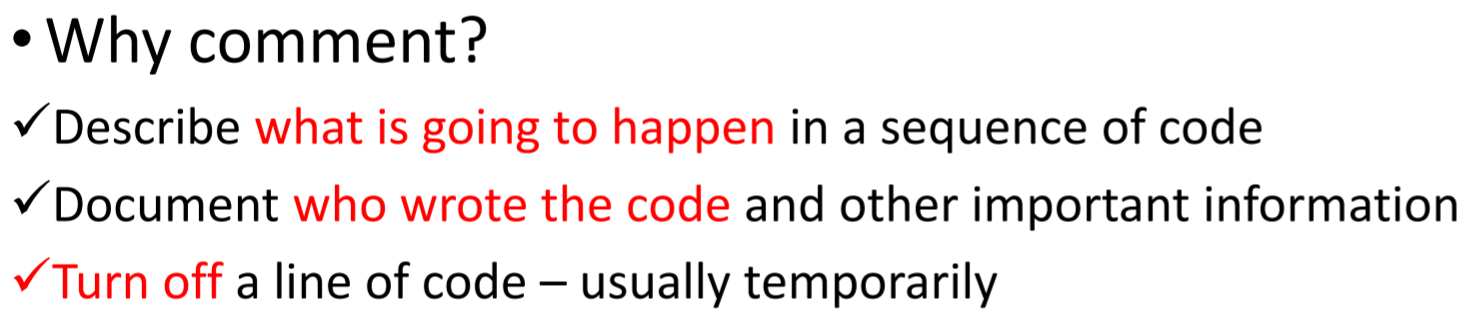
D) Strings can be concatenated using the + operator to combine them together.

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

3.1) Answer the following questions:

(a) Write down two advantages about writing comments in your Python code. (2 marks)

Answer:



答到2点及更多即给满分。只答了一方面的只给1分。

(b) Draw the figure of the following NRZI code. (3 marks)

00101011010

Answer：



答错直接没分。



3.2) Read the following programs and write the correct output. (5 marks \* 3)

(a)

1. x = 5 % 3
2. **for** num **in** range(1, 5):
3. result = num // 2 \* x
4. **print**(result)

Answer:

0

2

2

4

答对1个得1分，全对5分。全对但写在同一行扣一半分。

(b)

1. # Define a dictionary of products and their prices
2. products = {
3. "Apple": 0.5,
4. "Banana": 0.25,
5. "Orange": 0.75,
6. }
7. # Create a shopping cart
8. cart = {
9. "Apple": 3,
10. "Banana": 2,
11. }
12. # Display the items in the shopping cart and their total cost
13. **for** item, quantity **in** cart.items():
14. cost = products[item] \* quantity
15. **print**('You have ', quantity, ' ' + item + '(s). Cost: ', cost)

Answer:

You have 3 Apple(s) in your cart. Cost: 1.5

You have 2 Banana(s) in your cart. Cost: 0.5

每一行得2.5分。

(c)

1. **def** func(variable):
2. **try**:
3. **print**(int(variable))
4. **except**:
5. **print**("Error in ", variable)
6. **else**:
7. **print**("No error")
8. func("abc")
9. func("3.14")
10. func(6.28)

Answer:

Error in abc

Error in 3.14

6

No error

答对1行得1分，全对得5分，全写在一行里面扣一半分。

3.3) Concerning the following program and answer the following questions. (10 marks)

1. myDict = {"Barak": 21, "Amy": 18, "Caroline": 17, "Daniel": 25}
2. mySeq = list(myDict.items())
3. list1 = []
4. list2 = list()
5. **for** i **in** range(len(mySeq) - 1):
6. key, value = mySeq[i]
7. list1.append(key + ": " + str(value))
8. **if** value < 18:
9. **continue**
10. list2 += [(value, key)]
11. **print**(list1)
12. **print**(list2)
13. list2.sort()
14. list3 = sorted(list1)
15. **print**(list2)
16. **print**(list3)

A. How many elements are there in list2 and list3? (2.5 marks)

Answer: 2 and 3

答对一个得1分，全对得2.5分。

B. What are the outputs of the program? (2.5 marks)

Answer:

['Barak: 21', 'Amy: 18', 'Caroline: 17']

[(21, 'Barak'), (18, 'Amy')]

[(18, 'Amy'), (21, 'Barak')]

['Amy: 18', 'Barak: 21', 'Caroline: 17']

没写引号的也给分。

答对1个得0.5分，全对得2.5分

C. What are the data types of the elements in list1 and list2? (2.5 marks)

Answer:

str and tuple, respectively.

答对一个得1分，全对得2.5分

D. Describe the differences between sort() and sorted() in the code. (2.5 marks)

Answer:

1. **sort()**:
   * **list2.sort()** is an in-place sorting method, which means it directly modifies the original list (in this case, **list2**).
   * After **list2.sort()** is called, the **list2** variable is sorted in ascending order based on the first element of each tuple (the ages of individuals in **myDict**).
2. **sorted()**:
   * **sorted(list1)** is a built-in function that creates a new sorted list from the elements of the input list (**list1**) and returns the sorted list.
   * The **sorted()** function does not modify the original list (**list1**); it instead produces a new sorted list and assigns it to the **list3** variable.

In summary, the primary difference is that **sort()** modifies the original list in-place, while **sorted()** returns a new sorted list and leaves the original list unchanged. This is why, in the provided program, the output of **list2.sort()** changes the content of **list2** itself, whereas **sorted(list1)** creates a new sorted list and assigns it to the **list3** variable, leaving **list1** unchanged.

sort()答中了in-place sorting意思的给1分。

Sorted()答中了does not modify the original list, instead produces a new sorted list意思的给1分。

两个均答对的给2.5分。答错一个的，另一个意思对的，只给1分。