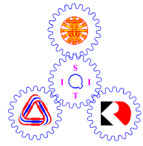


Name.....ID.....Section.....Seat No.....



# Sirindhorn International Institute of Technology Thammasat University

Midterm Examination: Semester 2 / 2022

Course Code/Title: ITS100: Introduction to Computers and Programming

Instructor: Asst. Prof. Dr. Tasanawan Soonklang

Date/Time: 28/02/2023

TIME 09:00 - 11:00

## Instructions:

➤ This examination paper has 13 pages (including this page).

➤ Conditions of Examination:

☐ Open book

☐ Closed book

☒ Semi-Closed book (.....sheet(s)    ☐ 1 page    ☒ both sides of A4 paper note)

☐ Other:.....

☒ No dictionary    ☐ Dictionary allowed

☒ No calculator    ☐ Calculator allowed

➤ Students are not allowed to be out of the examination room during examination.  
Going to the restroom may result in score deduction.

➤ Turn off all communication devices (mobile phone, etc.) and leave them at the front of the examination room.

➤ Write your name, student ID, section, and seat number clearly on the answer sheet(s).

➤ The space at the back of each page can be used if necessary.

➤ The examination paper is not allowed to be taken out of the examination room. A violation will receive zero (0) score.

## This exam consists of 2 parts as follows:

**Part 1:** Multiple choice problems (30 problems = 30 points) and scantron

**Part 2:** Short answer problems (6 problems = 30 points)

For multiple choice problems, use a number 2 pencil mark only one chosen answer for each problem in the provided scantron. Make sure your student ID is bubbled.

For short answer problems, provide only one answer in the blank space provided in this exam for each problem. **Write your name, student ID and your section on every page.**

### Part 1: Multiple Choice Problems (30 problems = 30 points)

1. Which of the followings is the hardware component that stores data outside the CPU?  
(a) Registers      (b) Cache      (c) Control unit      (d) ALU      **(e) Main memory**
2. Which of the followings is the hardware component that performs as a calculator inside the CPU?  
(a) Registers      (b) Cache      (c) Control unit      **(d) ALU**      (e) Main memory

3. What is the output of the following program?

```
1 print("25 mod 2 ")
2 # print("=")
3 25 % 2
```

- (a) 25 mod 2**  
(b) 25 mod 2   1  
(c) 25 mod 2 =  
1  
(d) 25 mod 2 = 1  
(e) SyntaxError, no output
4. Which of the following commands cause an error in Python?  
(a) print(5\*10)  
**(b) print((-1)\*\*5))**      extra closing bracket  
(c) print(10/2)  
(d) print(10^2)  
(e) print(0//10)

5. What cause the errors of the following program?

```
1 print("The result =')  
2 print(10/0)
```

- (a) Line 1 `SyntaxError` – invalid symbol,  
Line 2 `SyntaxError` – division by zero is undefined
- (b) Line 1 `SyntaxError` – invalid symbol,  
Line 2 `NameError` – division by zero is undefined
- (c) Line 1 `NameError` – missing closing quotation mark,  
Line 2 `SyntaxError` – division by zero is undefined
- (d) Line 1 `SyntaxError` – missing closing quotation mark,  
Line 2 `ZeroDivisionError` – division by zero is undefined
- (e) Line 1 `NameError` – missing closing quotation mark,  
Line 2 `ZeroDivisionError` – division by zero is undefined

6. What is the output of the following program?

```
1 a, b = "123", "2"  
2 print(a * int(b))
```

- (a) 123
- (b) 123123
- (c) 246
- (d) 1232
- (e) `TypeError`

7. What is the output of the following program when user inputs 10 ?

```
1 x = input("input values: ")  
2 print("Output =", x + 5)
```

- (a) Output = 5
- (b) Output = 10
- (c) Output = 15
- (d) Output = 105
- (e) `TypeError`

8. What is the output of the following program when user inputs 0 ?

```
1 x = int(input("input values: "))
2 print(type(x), bool(x))
```

- (a) <class 'int'> 0
- (b) <class 'str'> True
- (c) <class 'int'> False
- (d) <class 'str'> False
- (e) TypeError

9. Which command that calculates cos of pi when using **import math**?

- (a) cos(pi)
- (b) cos.pi
- (c) math.cos.pi
- (d) math.cos(pi)
- (e) math.cos(math.pi)

10. Which command that calculates sin of 30 degree when using **from math import \*** ?

- (a) sin(30)
- (b) sin(radians(30))
- (c) sin(degrees(30))
- (d) math.sin(radians(30))
- (e) math.sin(degress(30))

11. Which command that generates a random number between -10 to 10 inclusively when using **import random as r** ?

- (a) r.random(-10, 10)
- (b) r.randint(-10, 10)
- (c) r.choices(-10, 10)
- (d) r.shuffle(-10, 10)
- (e) r.sample(-10, 10)

12. Which of the followings is **NOT** a possible output of the program below?

```
1 print("%03d" % (random.randint(0, 10**3)))
```

- (a) 9
- (b) 001
- (c) 012
- (d) 123
- (e) 999

13. Which command that uses to check if the string **str** contains only alphabets?

- (a) `str.isalpha()`    (b) `str.isnumeric()`    (c) `str.lower()`    (d) `str.upper()`    (e) `str.strip()`

14. Which of the followings returns **True**?

- (a) `"1 2".isnumeric()`  
(b) `"abc".isnumeric()`  
(c) `"123".isnumeric()`  
(d) `"3.5".isnumeric()`  
(e) `"%.4f".isnumeric()`

15. What is the output of the following program?

```
1 a = "0"; b = 0
2 print(a == b, int(a) == b)
```

- (a) False False  
(b) True False  
(c) True True  
(d) False True  
(e) TypeError

In Python, when comparing different types like a string and an integer, the result is always False

16. Which of the followings returns **True**?

```
1 A = "ITS"
2 B = "Python"
3 C = "Programming"
```

- (a) `A > B`    (b) `A > C`    (c) `B > C`    (d) `A < B < C`    (e) `TypeError`

17. Which of the followings is the same meaning of  $50 \leq \text{score} \leq 100$ ?

- (a) `score >= 50 and score <=100`  
(b) `score ==> 50 and score <=100`  
(c) `score ==> 50 or score <=100`  
(d) `score >= 50 or score <=100`  
(e) `100 >= score ==> 50`

18. This program printed out 120. What could **NOT** be the user's input?

```
1 cm = int(input("Input cm: "))
2 if cm < 101:
3     fee = 0
4 elif cm < 131:
5     fee = 120
6 else:
7     fee = 450
8 print(fee)
```

- (a) 100      (b) 101      (c) 102      (d) 129      (e) 130

19. What is the output of the following program when user inputs 0?

```
1 n = input()
2 if n < 0:
3     print("negative")
4 elif n > 0:
5     print("positive")
6 else:
7     print("zero")
8 print("end")
```

- (a) negative positive zero end  
(b) positive zero end  
(c) zero end  
(d) end  
(e) TypeError

20. What is the output of the following program when user inputs 3?

```
1 n = int(input())
2 if n > 0:
3     print("1" * n, end = ", ")
4 if n % 2 == 0:
5     print("2" * n, end = ", ")
6 else:
7     print("0" * n, end = ", ")
```

- (a) 111,  
(b) 111, 222,  
(c) 111, 222, 000  
(d) 111, 000,  
(e) TypeError

21. What cause the first error of the following program when user inputs 3.5?

```
1 n = input()
2 if n > 0:
3     print(10 ** n)
4     else:
5         print(-1 * n)
```

- (a) ValueError at line 1
- (b) TypeError at line 1
- (c) TypeError at line 2
- (d) TypeError at line 3
- (e) IndentationError at line 4

22. What is the output of the following program?

```
1 n, count = -15, 10
2 if n > 0:
3     if n % 2 != 0:
4         count /= 2
5     else:
6         count %= 2
7 else:
8     if n % 2 != 0:
9         count //= 2
10    else:
11        count *= 2
12 print(count)
```

- (a) 5.0
- (b) 0
- (c) 5
- (d) 20
- (e) IndentationError

23. What is the output of the following program?

```
1 for x in range(2, 5, -1):
2     print(x, end = " ")
```

- (a) 2 3 4 5
- (b) 2 3 4
- (c) 5 4 3 2 1
- (d) No output
- (e) Syntax error

24. What is the output of the following program?

```
1 total = 0
2 for x in range(0.0, 3.0, 1.0):
3     total += x
4 print(total)
```

- (a) 0.0
- (b) 3.0
- (c) 6.0
- (d) No output TypeError
- (e) Syntax error**

25. Which range function generates the sequence of numbers the same as range(1, 10, 3)?

- (a) range(1, 8, 3)
- (b) range(1, 9, 3)
- (c) range(1, 10, 3)
- (d) All of the above**
- (e) None of the above

26. What is the output of the following program?

```
1 for x in range(4, 10, 2):
2     print(x, end = " ")
```

- (a) 4 6 8 10
- (b) 4 6 8**
- (c) 2 4 6 8 10
- (d) No output
- (e) Syntax error

27. What is the output of the following program?

```
1 s = 0
2 for num in ['1', '2', '3']:
3     s = s + int(num*2)
4 print(s)
```

- (a) 01234
- (b) 1234
- (c) 66**
- (d) 0112233
- (e) 00112233



28. Which range function in line 3 and expression in line 4, so that the output of this program prints out the value of  $1(2+1) + 2(3+2) + 3(4+3) + \dots + n(n+1+n)$  for a given integer  $n$ ?

```

1  n = int(input("Input n: "))
2  total = 0
3  for i in range(.....):
4      total += .....
5  print(total)

```

- | Line 3                 | Line 4            |
|------------------------|-------------------|
| (a) range(n)           | $(i+1) * (i+2+i)$ |
| (b) range(1, n)        | $i * (2 * i + 1)$ |
| <b>(c) range(1, n)</b> | $i * (i + 1 + i)$ |
| (d) range(1, n+1)      | $i * (i + 1)$     |
| (e) range(1, n+1)      | $i * (i * 2 + 1)$ |

29. Which string is the output of the following program?

```

1  sent = "row 1-2 row 3-4"
2  for token in sent.split():
3      if token.isalpha():
3          print(token.capitalize(), end = " ")

```

- (a) Row Row**
- (b) ROW ROW
- (c) Row 1-2 Row 3-4
- (d) ROW 1-2 ROW 3-4
- (e) No output

30. What is the output of the following program?

```

1  for ch in "Volume=1-No.2":
2      if ch.isalpha():
3          print(ch, end = "")

```

- (a) =1-.2
- (b) VN
- (c) =-.
- (d) Olumeo
- (e) VolumeNo**

**Part 2: Short Answer Problems** (6 problems = 30 points)

Provide only one answer in the blank space provided in this exam for each problem.

Write your name, student ID and your section on every page.

1. Complete the following program that accepts an integer,  $c$ , as the Celsius degree then convert to the Fahrenheit degree and print the result as shown on the right side, with 2 decimal point using placeholder. [3 pts]

```
1  c = int(input("Input Celcius: "))
2  f = c*9/5 + 32
3  print("Fahrenheit = %.2f" % f)
```

$$f = \frac{9}{5}c + 32$$

---

Input Celsius: 30

Fahrenheit = 86.00

---

2. Complete the following program that accepts 2 real numbers, kg and cm, then calculate the BMI (Body Mass Index) and print the result as shown on the right side. [3 pts]

```
1  kg, cm = input("Input kg and cm: ").split()
2  kg, cm = int(kg), int(cm)
3  m = cm / 100
4  bmi = kg / m * m
5  print("BMI = %.4f" % bmi)
```

$$bmi = \frac{kg}{m^2}$$

---

Input kg and cm: 56 158

BMI = 22.4323

---

3. Complete the following program to compute the solution for a quadratic equation. The user will enter 3 integers, then a program will check for input validation as follows:

- 1) all inputs are numbers,
- 2) not divisible by zero when calculate, and
- 3)  $b^2 - 4ac > 0$ .

If valid inputs, then calculate 2 solution values using the formula on the right side and print the results. If not valid inputs, print error message to the user. [6 pts]

```

1  import math..... # import here
2  a, b, c = input("Input: ").split()
3  if a..... and b..... and c..... :
4      if ..... and ..... :
5          x1 = .....
6          x2 = .....
7          print("x1 = %.1f, x2 = %.1f" %(x1,x2))
8      else:
9          print("No solution exists.")
10 else:
11     print("Invalid input.")

```

### Quadratic Equation

$$ax^2 + bx + c = 0$$

### Solutions

$$x_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

$$x_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

---

Input: 1 -2 -24

x1 = 6.0, x2 = -4.0

---

4. Complete the following program that accepts a real number as BMI, then checks input validation that BMI > 0.
- If invalid input, print "invalid number".
  - If valid input, print the weight classification of BMI value as shown in the table. [6 pts]

BMI	Type
Below 18.5	Underweight
18.5-24.9	Normal
25.0-29.9	Overweight
30.0 or higher	Obese

```

1  bmi = int(input(""))
2  if bmi > 0:
3      if bmi < 18.5:
4          print("Underweight")
5      elif bmi < 25:
6          print("Normal")
7      elif bmi < 30:
8          print("Overweight")
9      else:
10         print("Obese")
11 else:
12     print("Invalid input")

```

5. Complete the following program that accepts a positive number  $n$ , and prints upside-down pyramid of numbers as shown on the right side. [6 pts]

```

1  n = int(input("Input n: "))
2  for i in range(n):
3      for j in range(n-i, 0, -1):
4          print(j, end=" ")
5      print()

```

Input n: 4

4 3 2 1

3 2 1

2 1

1

6. Complete the following program that checks for a secure password according to the following rules: [6 pts]

- Length: Passwords should be at least 8 characters long, and ideally longer. The longer the password, the harder it is to guess or crack.
- Complexity: Passwords should include a combination of uppercase and lowercase letters, numbers, and special characters.

```
1 password = input()
2 upper, lower, number, symbol = 0, 0, 0, 0
3 special_char = "~!@#$%^&*()_+`-={}|[]\\:\";'<>?,./"
4 for i in password:
5     if i.isupper():
6         upper += 1
7     elif i.islower():
8         lower += 1
9     elif i.isnumeric():
10        number += 1
11    elif i in special_char:
12        symbol += 1
13 length = len(password)
14 if length >= 8:
15     if upper > 0 and lower > 0 and number > 0 and symbol > 0:
16         print("Strong password")
17     else:
18         print("Weak password")
19 else:
20     print("Password must be at least 8 characters")
```