Control Structures

# Before Class

1. Find out what programming language statements are used to handle decisions and performs computations and actions conditionally.

‘if’ statement

‘if – else’ statement

‘if – elif – else’ statement

‘switch’ or ‘case’ statement

Logical operators

1. Read chapter 3 "Conditional execution" from the textbook.  
     
   **Ćwiczenie 1.** Przepisz ponownie swój program obliczający wynagrodzenie, tak aby dać pracownikowi 1,5 raza większą stawkę godzinową za czas przepracowany powyżej 40 godzin

liczba = int(input('Podaj liczbe godzin: '))

stawka = int(input('Podaj stawke godzinowa: '))

if liczba > 40:

    nadgodziny = liczba - 40

    wynagrodzenie = (stawka \* 40) + (nadgodziny \* stawka \* 1.5)

else:

    wynagrodzenie = stawka \* liczba

print(f'Wynagrodzenie: {wynagrodzenie}')

**Ćwiczenie 2.** Przepisz ponownie swój program płacowy, używając try i except, tak aby elegancko obsługiwał on nienumeryczne dane wejściowe, wyświetlając w takim przypadku wiadomość i kończąc swoje działanie.

liczba = input('Podaj liczbe godzin: ')

stawka = input('Podaj stawke godzinowa: ')

try:

    kwota = int(liczba)

    wyplata = int(stawka)

    if kwota > 40:

        nadgodziny = kwota - 40

        wynagrodzenie = (wyplata \* 40) + (nadgodziny \* wyplata \* 1.5)

    else:

        wynagrodzenie = wyplata \* kwota

    print(f'Wynagrodzenie: {wynagrodzenie}')

except:

    print('Bląd, podaj wartość numeryczną')

**Ćwiczenie 3.** Napisz program, który poprosi użytkownika o wartość pomiędzy 0.0 a 1.0. Jeśli wartość jest poza zakresem, wypisz komunikat o błędzie. Jeśli wartość jest między 0.0 a 1.0, wypisz ocenę

wartosc = input('Podaj wartość: ')

try:

    liczba = float(wartosc)

    if 0.0 < liczba < 0.5:

        print('2.0')

    elif 0.5 <= liczba < 0.6:

        print('3.0')

    elif 0.6 <= liczba < 0.7:

        print('3.5')

    elif 0.7 <= liczba < 0.8:

        print('4.0')

    elif 0.8 <= liczba < 0.9:

        print('4.5')

    elif 0.9 <= liczba <= 1.0:

        print('5.0')

    else:

        print('Niepoprawna wartosc')

except:

    print('Niepoprawna wartosc')

1. Watch the videos on using if-then-else conditional statements in Python:

<https://youtu.be/FvMPfrgGeKs?feature=shared>

<https://youtu.be/Zp5MuPOtsSY?feature=shared>

<https://youtube.com/playlist?list=PLi01XoE8jYohWFPpC17Z-wWhPOSuh8Er->

1. How, in a computer program, it is possible to execute a program statement multiple times. Familiarise yourself with loop statements (for and while).

# Example of a for loop in Python

for i in range(5):  # This will iterate 5 times (i will take values 0, 1, 2, 3, 4)

    print(f"Iteration {i+1}: Hello, world!")

Iteration 1: Hello, world!

Iteration 2: Hello, world!

Iteration 3: Hello, world!

Iteration 4: Hello, world!

Iteration 5: Hello, world!

# Example of a while loop in Python

count = 0

while count < 5:  # This loop will continue as long as count is less than 5

    print(f"Iteration {count+1}: Hello, world!")

    count += 1  # Increment count by 1 in each iteration

Iteration 1: Hello, world!

Iteration 2: Hello, world!

Iteration 3: Hello, world!

Iteration 4: Hello, world!

Iteration 5: Hello, world!

1. Watch the video on using the "for" statement in Python:

<https://youtu.be/94UHCEmprCY>

for x in range(2):

    for y in range(3):

        print(f'({x}, {y})')

(0, 0)

(0, 1)

(0, 2)

(1, 0)

(1, 1)

(1, 2)

count = 0

for number in range(1, 10):

    if number % 2 == 0:

        count += 1

        print(number)

print(f'We have {count} even numbers')

2

4

6

8  
We have 4 even numbers

1. Find out what the term “debugging” means. Then watch the video explaining how to test your program using the debugger.

<https://youtu.be/KEdq7gC_RTA>

<https://youtu.be/b4p-SBjHh28?feature=shared>

The term "debugging" refers to the process of identifying, analyzing, and removing errors or bugs from a computer program or software.

1. In the following program, mark breakpoints in lines 1, 5 and 7. Then, do the tasks below:
   1. Run the program in debug mode. Then, execute all program statements, one by one. Observe the changing values of variables.
   2. Run the program in debug mode. Move between the marked breakpoints.
   3. Run the program in debug mode. Add the variable ‘sum’ and ‘number’ to the Watch window, and the expression number <= 5. Execute the program step by step. Observe the changes in the variables and in the added expression.

sum = 0  
number = 1  
while number <= 5:  
 sum = sum + number  
 number = number + 1  
message = f"Sum of numbers in <1,5> is {sum}"  
print(message)

sum = 0

number = 1

while number <= 5:

  sum = sum + number

  number = number + 1

message = print(f"Sum of numbers in <1,5> is {sum}")

print(message)

# During Class

## Conditional statement

1. The speed limit on a motorway in Poland is 140 km/h. Write a program that checks whether a car exceeded the speed limit. If so, a warning is displayed. Sample result:

speed\_limit = 140  
car\_speed = int( input('Enter car speed km/h: ') )  
  
if car\_speed > speed\_limit:  
 print('Warning: speed limit exceeded!!')

1. A test is passed when the number of correctly completed tasks is at least 50%. Write a program that checks whether the test is passed. The total number of test tasks and the number of correctly completed tasks are included in variables. Sample result:

Test passed

total\_points = int(input('Enter total points: '))

gained\_points = int(input('Enter gained points: '))

percent = (gained\_points \* 100) / total\_points

if percent >= 50:

    print('Test passed')

else:

    print('Test failed')

1. Write a program to calculate the absolute value of a number entered from the keyboard. Sample result:

Enter number: -17  
|-17| = 17

number = int(input('Enter number: '))

if number < 0:

    new\_number = number \*(-1)

else:

    new\_number = number

print(f'|{number}| = {new\_number}')

1. Write a program that checks whether the number entered from the keyboard is even or odd. Sample result:

Enter number: 27  
Number is odd

number = int(input('Enter number: '))

if number % 2 == 0:

    print('Number is even')

else:

    print('Number is odd')

1. Write a program that checks that two people are adults. Read people’s data from the keyboard. Sample result:

Enter first person name: Peter  
Enter first person age: 21  
Enter second person name: Ann  
Enter second person age: 18  
Both Peter and Ann are adults

first\_name = input('Enter first person name: ')

first\_age = int(input('Enter first person age: '))

second\_name = input('Enter second person name: ')

second\_age = int(input('Enter second person age: '))

if first\_age >= 18 and second\_age >= 18:

    print(f'Both {first\_name} and {second\_name} are adults')

elif first\_age >= 18 and second\_age < 18:

    print(f'Only {first\_name} is adult')

elif first\_age < 18 and second\_age >= 18:

    print(f'Only {second\_name} is adult')

elif first\_age < 18 and second\_age < 18:

    print(f'Neither {first\_name} and {second\_name} are adults')

1. A user enters two integer numbers from the keyboard. Write a program that checks whether at least one of them is not negative. Sample result:

Enter number 1: 25  
Enter number 2: -17  
At least one of entered numbers 25 and -17 is not negative

number\_one = int(input('Enter number 1: '))

number\_two = int(input('Enter number 2: '))

if number\_one > 0 or number\_two > 0:

    print(f'At least one of entered numbers {number\_one} and {number\_two} is not negative')

else:

    print(f'Both numbers {number\_one} and {number\_two} are negative')

## Loops

1. Write a program that displays the sentence "Practice makes perfect" four times. Use the "while" statement.

i = 1  
while i <= 4:  
 print('Practice makes perfect!!')  
 i = i + 1

1. Write a program that displays the sentence "Practice makes perfect" four times. Use the "for" statement.

for i in range(4):  
 print('Practice makes perfect!')

1. Write a program that calculates the sum of integer numbers in the range <1,5>. Use the "for" statement.

sum = 0  
for i in range(1,6):  
 print(i)  
 sum = sum + i  
print(f'Sum is {sum}')

1. Write a program that calculates the sum of integer numbers in the range <1,5>. Use the "while" statement.

sum = 0

i = 1

while i<=5:

    print(i)

    sum = sum + i

    i = i + 1

print(f'Sum is {sum}')

1. Write a program that calculates values for the following fractions: 1/2, 1/3, ..., 1/10. First, Use the "while" statement, then, the "for" statement. Sample result:

1/1 = 1.0  
1/2 = 0.5  
1/3 = 0.3333333333333333  
…  
1/10 = 0.1

i = 1

while i<=10:

    divide = 1/i

    print(f'1/{i}={divide}')

    i = i + 1

for i in range(1, 11):

    divide = 1/i

    print(f'1/{i}={divide}')

1. Write a program that calculates the sum of even numbers in the range <1,10>.

sum = 0

for i in range(1, 11):

    if i % 2 == 0:

        sum = sum + i

print(sum)

## Debugging

1. The following program calculates the sum of the integers in the range 1 to 5. Run the program in debug mode and try to analyse the program execution. See how you can execute the program step by step and track changes in variable values.

sum = 0  
for i in range(1,6):  
 print(i)  
 sum = sum + i  
print(f'Sum is {sum}')

# After Class

1. Write a program that displays two numbers entered from the keyboard in ascending order.

Enter first number: 27  
Enter second number: 14  
Numbers in ascending order: 14, 27

first\_number = int(input('Enter first number: '))

second\_number = int(input('Enter second number: '))

if first\_number > second\_number:

    print(f'Numbers in ascending order: {second\_number}, {first\_number}')

else:

    print(f'Numbers in ascending order: {first\_number}, {second\_number}')

1. Most female names in Polish end with the letter "a". Write a program that displays the name entered from the keyboard, provided it is a female name. Sample result:

Enter name: Anna  
Anna – Polish female name

name = input('Enter name: ')

if name[-1] == 'a':

    print(f'{name} - Polish female name')

else:

    print(f'{name} - Polish male name')

1. Write a program that calculates a dog's age in dog’s years. For the first two years, a dog's life is equal to 10.5 human years. After that, each dog year is equal to 4 human years. Sample result:

Enter the dog's age in human years: 15  
The dog's age in dog’s years is 73 years.

human\_years = int(input('Enter the dog\'s age in human years: '))

if human\_years <=2:

    dog\_years = human\_years \* 10.5

else:

    left = human\_years - 2

    dog\_years = 21 + 4 \* left

print(f'The dog\'s age in dog\'s years is {dog\_years} years')

1. A computer program analyses the price of a product in an online store. If the product price decreases by at least 10%, the program displays a purchase recommendation:

Buy the product!!  
Product price reduced by 17%

Create such program. The current and previous price of the product are included in the variables. Sample result:

Current product price: 140.00  
Previous product price: 200.00  
Buy the product!!  
Product price reduced by 30%

current\_price = float(input('Current product price: '))

previous\_price = float(input('Previous product price: '))

decrease = previous\_price - current\_price

percent = (decrease \* 100)/previous\_price

if percent >= 10:

    print(f'Buy the product!\nProduct price reduced by {percent}%')

else:

    print('Not recommended')

1. In one of the online stores, a 25% discount is charged for each product purchased over two. Write a program that calculates the amount to be paid. Read the number of purchased products and the product price from the keyboard. Sample result:

Number of products purchased: 5  
Product price: 40  
Amount to pay: 170.00

number = int(input('Number of products purchased: '))

price = int(input('Product price: '))

if number > 2:

    discount = price \* 0.25

    amount = (number \* price) - ((number - 2) \* 0.25 \* price)

else:

    amount = price \* number

print(f'Amount to pay: {amount}')

1. The speed of vehicles on highways in Poland is at least 40 km/h and not more than 140 km/h. Write a program that displays a message when the specified car speed, read from the keyboard, has been exceeded. Sample result:

Enter car speed: 38  
Warning: invalid car speed!!

Use the following variables in your program:

car\_speed  
speed\_limit\_min  
speed\_limit\_max

car\_speed = int(input('Enter car speed: '))

speed\_limit\_min = 40

speed\_limit\_max = 140

if car\_speed < speed\_limit\_min or car\_speed > speed\_limit\_max:

    print('Warning: invalid car speed!!')

1. An influencer is a person who can influence other people's behaviour. An influencer communicates with other people using social networking sites. Write a program that checks whether a given person can be a good influencer, that is, whether the person has at least two of the following accounts: Facebook, Twitter or Instagram. Use logical type variables: facebook, twitter, instagram, the value of which indicates whether the person has an account on the social networking site. Sample result:

facebook = True  
twitter = False  
instagram = True  
A person can be a good influencer!

facebook = True

twitter = False

instagram = True

if (facebook and twitter) or (facebook and instagram) or (instagram and twitter):

    print('A person can be a good influencer!')

1. EAN-13 (European Article Number) is a barcode for marking goods. The first 3 digits (590) usually indicate goods manufactured in Poland. Write a program that checks whether the EAN-13 number entered from the keyboard consists of exactly 13 characters (digits). Display a message if the number is correct. Additionally, only when the article number is correct, display a message when the product was manufactured in Poland. Sample result:

Enter EAN-13 article number: 5901230094938  
Article number is correct  
Article manufactured in Poland

number = input('Enter EAN-13 article number: ')

if len(number) == 13:

    print('Article number is correct')

    if number[0] == '5' and number[1] == '9' and number[2] == '0':

        print('Article manufactured in Poland')

else:

    print('Article number is incorrect')

1. A washing machine allows you to wash a jacket, which takes 40 minutes, wash underwear, which takes 70 minutes, and wash shoes, which takes 20 minutes. In addition, it is possible to program an additional rinse (15 minutes) and an additional spin (9 minutes). The washing machine settings are saved in variables. Write a program that calculates and displays the total washing time. Sample result:

washing\_product = "shoes"  
rinse = True  
spin = False  
Total washing time: 35 minutes

washing\_product = "shoes"

rinse = True

spin = False

if washing\_product == "shoes":

    wash\_time = 20

elif washing\_product == "jacket":

    wash\_time = 40

elif washing\_product == "underwear":

    wash\_time = 70

if rinse == True:

    rinse\_time = 15

else:

    rinse\_time = 0

if spin == True:

    spin\_time = 9

else:

    spin\_time = 0

total = wash\_time + rinse\_time + spin\_time

print(f'Total washing time: {total} minutes')

1. Write a program that allows you to convert time in 24-hour format to 12-hour format. The time in 24-hour format (hh:mm) is read from the keyboard. Sample result:

Enter time (24-hour format): 16:32  
Time in 12-hour format: 4:32pm

time = input('Enter time: ')

minutes = time[3] + time[4]

if time[0] == '0':

    first = time[1]

    print(f'Time in 12-hour format: {first}:{minutes}')

else:

    number = int(time[1])

    first = number - 2

    print(f'Time in 12-hour format: {first}:{minutes}pm')

1. Let x and y denote the coordinates of a point on the plane. Write a program that determines in which quadrant of the coordinate system the point P (x, y) is located or on which axis it is located, or that it is located in the position (0,0) of the coordinate system. Sample result:

x = 5  
y = 2  
Point P(5,2) is in the first quadrant of the coordinate system

x = 5

y = 2

if x > 0 and y > 0:

    print(f'Point P({x}, {y}) is in the first quadrant of the coordinate system')

elif x < 0 and y > 0:

    print(f'Point P({x}, {y}) is in the second quadrant of the coordinate system')

elif x < 0 and y < 0:

        print(f'Point P({x}, {y}) is in the third quadrant of the coordinate system')

elif x > 0 and y < 0:

        print(f'Point P({x}, {y}) is in the fourth quadrant of the coordinate system')

1. Yes-no question are often used in surveys to gauge people's attitudes with regard to specific ideas or beliefs. Write a program that displays a survey consisting of three questions. Save the answers to logical type variables. Then view the survey result. Sample result:

Are you interested in computer science? (Y/N): Y   
Do you like playing computer games? (Y/N): N  
Do you have an Instagram account? (Y/N): Y  
Interested in computer science: Yes  
Playing computer games: No  
Has an Instagram account: Yes

computer = input('Are you interested in computer science (Y/N): ')

games = input('Do you like playing games (Y/N): ')

instagram = input('Do you have an Instagram account (Y/N): ')

if computer == 'Y':

    print('Interested in computer science: Yes')

elif computer == 'N':

    print('Interested in computer science: No')

else:

    print('Incorrect answer')

if games == 'Y':

    print('Interested in computer science: Yes')

elif games == 'N':

    print('Interested in computer science: No')

else:

    print('Incorrect answer')

if instagram == 'Y':

    print('Interested in computer science: Yes')

elif instagram == 'N':

    print('Interested in computer science: No')

else:

    print('Incorrect answer')

1. Write a program that converts a decimal number into a binary number. To convert a decimal number to binary, follow these steps:
   1. Read a decimal number from the keyboard.
   2. Divide the number by 2 and note the remainder.
   3. Divide the quotient obtained by 2 and note the remainder.
   4. Repeat the same process till we get 0 as the quotient.
   5. Write the values of all the remainders starting from the bottom to the top. That will be the required binary number.

Sample result:

Enter decimal number: 12  
12(10) = 1100(2)

decimal = int(input('Enter decimal number: '))

binary = ""

if decimal == 0:

    binary = '0'

else:

    while decimal >= 1:

        remainder = decimal % 2

        binary = binary + str(remainder)

        decimal = int(decimal / 2)

reverse = binary[::-1]

print(f'{decimal}(10) = {reverse}(2)')

1. There are coins of 1, 2 and 5 Polish Zlotys (PLN). Write a program showing any amount (natural number) read from the keyboard with as few coins as possible.

Enter the amount in PLN: 18  
The amount of PLN 18 in coins:  
5 zł – 3   
2 zł – 1   
1 zł – 1

amount = int(input('Enter the amount in PLN: '))

num\_5 = amount // 5

amount %= 5

num\_2 = amount // 2

amount %= 2

num\_1 = amount

print("Minimum coins needed:")

if num\_5 > 0:

    print(f"5 PLN: {num\_5} coin(s)")

if num\_2 > 0:

    print(f"2 PLN: {num\_2} coin(s)")

if num\_1 > 0:

    print(f"1 PLN: {num\_1} coin(s)")

1. Write a program that displays numbers from 1 to 30. If the number is divisible by 3 then the program displays the word 'THREE'. Next, if the number is divisible by 5 then the program displays the word 'FIVE'. Finally, if the number is divisible by both 3 and 5 then the program displays the word 'BINGO'. Sample result:

1 2 THREE 4 FIVE THREE 7 ...

for i in range (1, 31):

    if  i % 5 == 0 and i % 3 == 0:

        print('THREE')

    elif i % 5 == 0:

        print('FIVE')

    elif i % 3 == 0:

        print('BINGO')

    else:

        print(i)

1. Write a program that creates a multiplication table in the range 1 to 10 for any number entered by the user. Sample result:

Enter number: 6  
6 x 1 = 6  
6 x 2 = 12  
6 x 3 = 18  
6 x 4 = 24  
6 x 5 = 30  
6 x 6 = 36  
6 x 7 = 42  
6 x 8 = 48  
6 x 9 = 54  
6 x 10 = 60

number = int(input('Enter number: '))

for i in range (1, 10):

    print(f'{number} x {i} = {number\*i}')

1. Write a program that creates the following pattern (half diamond). Sample result:

https://www.w3resource.com/python-exercises/python-conditional-statements-and-loop-exercises.php

\*   
\* \*   
\* \* \*   
\* \* \* \*   
\* \* \* \* \*   
\* \* \* \*   
\* \* \*   
\* \*   
\*

for i in range(1, 6):

    print('\*'\*i)

for j in range (4, 0, -1): #range(start\_value, end\_value, step)

    print('\*'\*j)

1. Write a program that creates the following pattern. Sample result:

1  
22  
333  
4444  
55555  
666666  
7777777  
88888888  
999999999

for i in range (1, 10):

    print(str(i) \* i)

1. The variables a and b contain the dimensions of the sides of the rectangle. Write a program that creates the following rectangle with dimensions a and b. Sample result for a = 4 and b = 15:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  
\* \*  
\* \*  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

for i in range(a):

    if i == 0 or i == a-1:

        for j in range(b):

            print('\*', end='')

    print('\*' + ' '\*(b-1) + '\*')

1. The 'university' variable contains the name of university where you are studying. Write a program that displays the contents of the variable with an extra space between characters (add a space between each character). Sample result:

Krakow University of Economics  
K r a k o w U n i v e r s i t y o f E c o n o m i c s

for i in range(30):

    print(university[i] + ' ', end='')

1. The payment card is secured with a four-digit PIN code (0805). Write a program that checks if the PIN code entered in the payment terminal is correct. The user has up to three possibilities for entering a PIN code. In case of three unsuccessful attempts, the card is blocked. Sample result:

Enter the PIN code: 2398  
Incorrect...  
Enter the PIN code: 0912  
Incorrect...  
Enter the PIN code: 7860  
Incorrect...  
Sorry, your payment card has been blocked.

code = input('Enter the PIN code: ')

pin = '0805'

if code[0] != pin[0] or code[1] != pin[1] or code[2] != pin[2] or code[3] != pin[3]:

    for i in range(2):

        if code[0] != pin[0] or code[1] != pin[1] or code[2] != pin[2] or code[3] != pin[3]:

            print('Incorrect..')

            code = input('Enter the PIN code: ')

    print('Sorry, your payment card has been blocked')

1. A computer numeric keyboard has the arrangement of the keys as below. The included program code displays the computer keyboard. Analyse the program in terms of the displayed results. Do you understand each program statement? Then make a change in your program code. Replace the ‘for’ with a ‘while’ statement.

7 8 9  
4 5 6  
1 2 3

for i in range(6,-1,-3):  
 for j in range(1,4):  
 print(f' {i+j}',end='')  
 print()

i = 6

while i >= 0:

    j = 1

    while j < 4:

        print(f' {i+j}', end='')

        j += 1

    print()

    i -= 3

1. Write a program that displays the first twenty words of the Fibonacci sequence. The sequence is defined as follows: the first term is equal to 0, the second is equal to 1, each subsequent term is the sum of the previous two. Sample result:

https://en.wikipedia.org/wiki/Fibonacci\_number

0 1 1 2 3 5 8 13 21 34 ...

a = 1

b = 1

print('term 0 / number: 0')

print('term 1 / number: 1')

print('term 2 / number: 1')

for term in range (3,21):

    c = a + b

    print(f'term: {term} / number: {c}')

    a = b

    b = c

1. Write a program that calculates the sum and arithmetic mean of numbers entered from the keyboard. Entering 0 ends entering numbers. Sample result:

Enter number: 15  
Enter number: 8  
Enter number: 10  
Enter number: 0  
RESULT: Quantity=3, Sum=33, Mean=11

number = int(input('Enter number: '))

count = 0

sum = number

while number != 0:

    number = int(input('Enter number: '))

    count = count + 1

    sum = sum + number

mean = int(sum / count)

print(f'RESULT: Quantity = {count}, Sum = {sum}, Mean = {mean}')

1. A natural number greater than 1 is called a prime if it has exactly 2 natural factors with the values 1 and this number. Write a program that finds N leading prime numbers. Read the value of N from the keyboard. Using loop statements check that the number N is divisible only by 1 and by N.

Prime numbers: 2 3 5 7 11 …

# Number of prime numbers to find

N = 10

# Initialize variables

count = 0  # To count the number of primes found

num = 2    # The current number to be checked for primality

# Loop to find and print the first 10 prime numbers

while count < N:

    is\_prime = True

    # Check if the current number is prime

    for i in range(2, int(num\*\*0.5) + 1):

        if num % i == 0:

            is\_prime = False

            break

    # If the number is prime, print it and increment the count

    if is\_prime:

        print(num, end=' ')

        count += 1

    # Move to the next number

    num += 1

1. Write a program that displays a lottery coupon (numbers from 1 to 49) in the format as below.

1 8 15 22 29 36 43  
 2 9 16 23 30 37 44  
 3 10 17 24 31 38 45  
 4 11 18 25 32 39 46  
 5 12 19 26 33 40 47  
 6 13 20 27 34 41 48  
 7 14 21 28 35 42 49

# Initialize the maximum number and the number of columns

max\_num = 49

cols = 7

# Loop to generate and print the numbers in the specified format

for row in range(1, cols + 1):

    for col in range(row, max\_num + 1, cols):

        print(f"{col:2}", end=' ')

    print()

1. Write a program that displays 20 integer random numbers in the range of 5 to 10.

import random

# Generate and print 20 random integers in the range of 5 to 10

for \_ in range(20):

    random\_integer = random.randint(5, 10)

    print(random\_integer, end=' ')

1. Select any 3 programs you have created. Run each of them in debug mode. Execute each program, step by step, and observe the values of all variables.