Subroutines

Worked example .

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10 | def calculate(a, b):  answer = a + b  print(f"{a} + {b} = {answer}")  print("Enter a number:")  num1 = int(input())  print("Enter another number:")  num2 = int(input())  calculate(num1, num2) |

Task 1: The average number .

**Step 1**

Define a subroutine called average\_value. The average\_value subroutine should accept three parameters: a, b, and c.

**Step 2**

The purpose of the average\_value subroutine is to calculate the average of three numbers and output them for the user.

Create a variable called average and assign to it an expression that will calculate the average of the three values passed through the parameters.

**Tip:** To calculate the average, you must first add the three numbers together and then divide that number by three.

**Step 3**

After the average has been calculated, the program should display the output:

The average value is {average}

**Step 4**

Test your subroutine by calling it. You can call your subroutine by adding the line average\_value(6,8,10) to the end of your program.

If your program is working correctly, then it should display the following when it is executed:

The average value is 8.0

**Step 5**

Delete the testing line of code.

Create three user prompts that will ask for the three numbers. The answers should be held in three variables: num1, num2, and num3.

**Step 6**

Create a subroutine call that will pass the arguments num1, num2, and num3 to the average\_value subroutine.

**Step 7**

Test your program. Use the table below to make sure that your program is working correctly.

|  |  |  |
| --- | --- | --- |
| **Example:**  (✔ if it was successful) | |  |
| **Note:** Use this example to check your program. This is the output your program should produce for the given input. | | ✔ |
| The user is given a prompt. | Enter an number: |  |
| The user enters their reply and it is held in a variable. | 4 |  |
| The user is given another prompt. | Enter another number: |  |
| The user enters their reply and it is held in a variable. | 8 |  |
| The user is given another prompt. | Enter another number: |  |
| The user enters their reply and it is held in a variable. | 10 |  |
| The three variables are passed as arguments to the subroutine. The subroutine calculates the average value and the value is displayed. | The average value is 7.333333333333333 |  |

Task 2: The highest number .

**Step 1**

Define a subroutine called highest. The highest subroutine should accept two parameters: a and b.

**Tip**: Use the worked example above to help you structure your subroutine.

**Step 2**

The purpose of the highest subroutine is to output the highest number passed into it.

Create an if, else statement with a condition to check if one value **is higher than** the other.

The highest value should be held in a variable called highest\_num.

**Tip**: Look at previous programs that you have created where one value has been compared to another.

**Step 3**

Create a print statement that will output The highest number entered is {highest\_num} directly after the if, else statement.

**Step 4**

Test your subroutine. In order to test your subroutine, you will need to call it. You can call your subroutine by adding the line highest(8,2) to the end of your program.

If your program is working correctly, then it should display the following when it is executed:

The highest number entered is 8

**Tip:** Check your indents. The subroutine call should be all the way to the left.

**Tip:** If your program was unsuccessful, then you should refer to the worked example and other programs that you have used to compare one value with another.

**Step 5**

Delete the testing line of code highest(8,2).

Create a user prompt that will ask for a number. The response should then be held in a variable called num1.

Create another user prompt that will ask for another number. The response should then be held in a variable called num2.

**Tip:** See the worked example above (page 1) for help with this step.

**Step 6**

Create a subroutine call that will pass the arguments num1 and num2 to the highest subroutine.

**Tip:** Use the subroutine call from step 4 as a guide for this.

**Step 7**

Test your program. Use the table below to make sure that your program is working correctly.

|  |  |  |
| --- | --- | --- |
| **Example:**  (✔ if it was successful) | |  |
| **Note:** Use this example to check your program. This is the output your program should produce for the given input. | | ✔ |
| The user is given a prompt. | Enter an number: |  |
| The user enters their reply and it is held in a variable. | 4 |  |
| The user is given another prompt. | Enter another number: |  |
| The user enters their reply and it is held in a variable. | 8 |  |
| The two variables are passed as arguments to the subroutine. The subroutine checks for the highest value. The highest value is displayed. | The highest number entered is 8 |  |

Explorer task .

* Create a subroutine that will multiply two numbers
* Create a subroutine that will find the lowest value of three numbers