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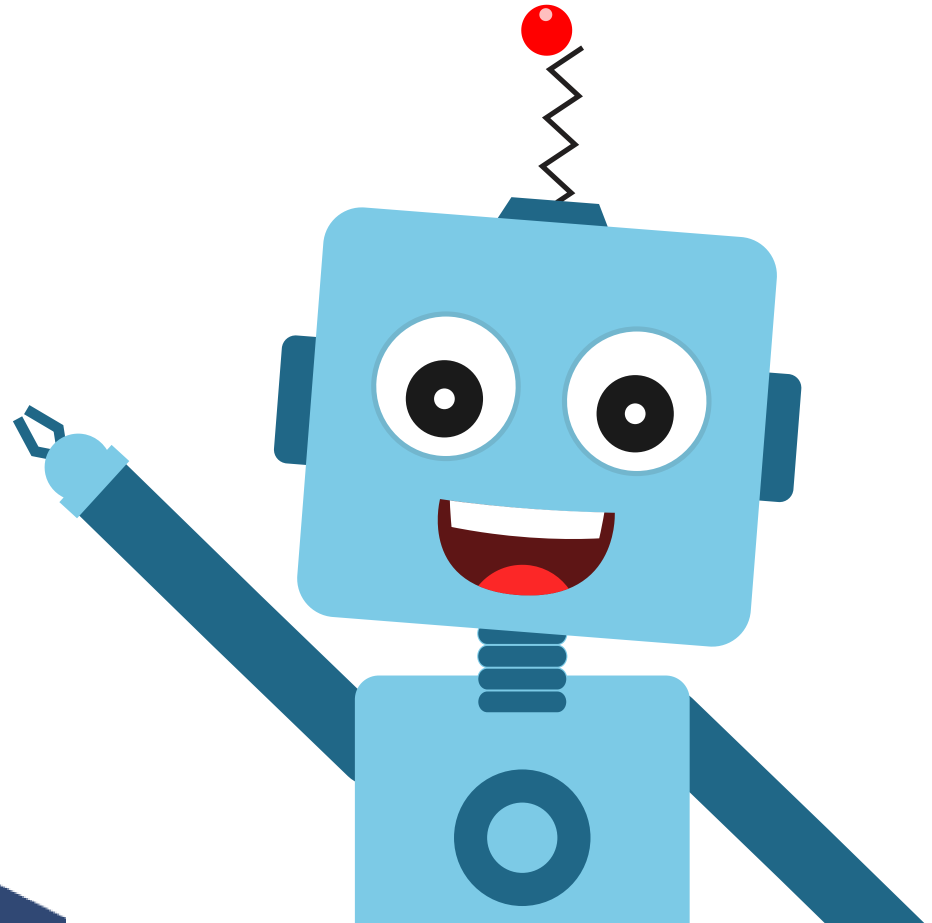
Variables and Operators in Programming

Session 2



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Topics covered

- Introduction to Variables and Operators
- Different types of Operators
- Activity : Addition Bot
- Activity : Multiplication Bot
- Activity: Area Calculation

Introduction to Variables and Operators

Variables and Operators

- Variables are used in programming to temporarily store data and information that can be used throughout the program. They allow programmers to reuse data and manipulate it in different ways, without having to recreate the data every time it is needed.
- Variables in a program must be given unique names to act as identifiers. Duplicate names are not allowed in programming, making it easier to call variables and understand their context. Some rules for naming a variable are as follows:
- Variable names should start with a letter or underscore, but not a number or special character.
- Only letters, numbers, and underscores should be used in variable names, and no spaces or special characters.
- Variable names should be descriptive and meaningful, such as using "**numberOfStudents**" instead of "**x**".
- Variable names should be short but descriptive, with a length of 1-2 words or up to 20 characters.
- Variable names can be written in camelCase or **snake_case** format.
- Variable names should not be the same as keywords or reserved words in the programming language being used.

Data Types

The common data types that we can use in programming:

1. **Integer** (int): Integers are whole numbers, positive, negative or zero, with no decimal points.
2. **Float** (float): Floats are numbers that have a decimal point or a fractional part.
3. **Boolean** (bool): Booleans have only two possible values: True or False. They are often used for comparison and control flow statements.
4. **String** (str): Strings are sequences of characters enclosed in quotes (either single or double quotes). They can contain letters, numbers, and special characters.
5. **List** (list): Lists are ordered collections of values, separated by commas and enclosed in square brackets. They can hold values of any data type.
6. **Tuple** (tuple): Tuples are similar to lists but are immutable, meaning their values cannot be changed after they are created.
7. **Dictionary** (dict): Dictionaries are unordered collections of key-value pairs, enclosed in curly braces. They are used to store and access data using keys.
8. **Set** (set): Sets are unordered collections of unique values, enclosed in curly braces. They are often used for mathematical operations such as union, intersection, and difference

Operators

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Operators are special symbols that represent computation. They are applied to operand(s), which can be values or variables. The same operator can behave differently on different data types. Value and variables when used with an operator are known as operands.

	Description	Example 1	Example 2
+	Addition	print(60+40) >> 100	print("Good" + "Day") >>GoodDay
-	Subtraction	print(60 - 40) >> 20	print(30-90) >> -60
*	Multiplication	print(50*4) >> 200	print(“Good”*3) >> GoodGoodGood
/	Division	print(17/5) >> 3.4	print(1.8/2) >> 0.9
//	Integer Division	print(9//2) >> 4	print(401//2) >> 200
%	Remainder / Modulo	print(24%5) >> 4	print(13%2) >> 1
**	Exponentiation	print(3**2) >> 9	print(4**3) >> 64

ACTIVITY

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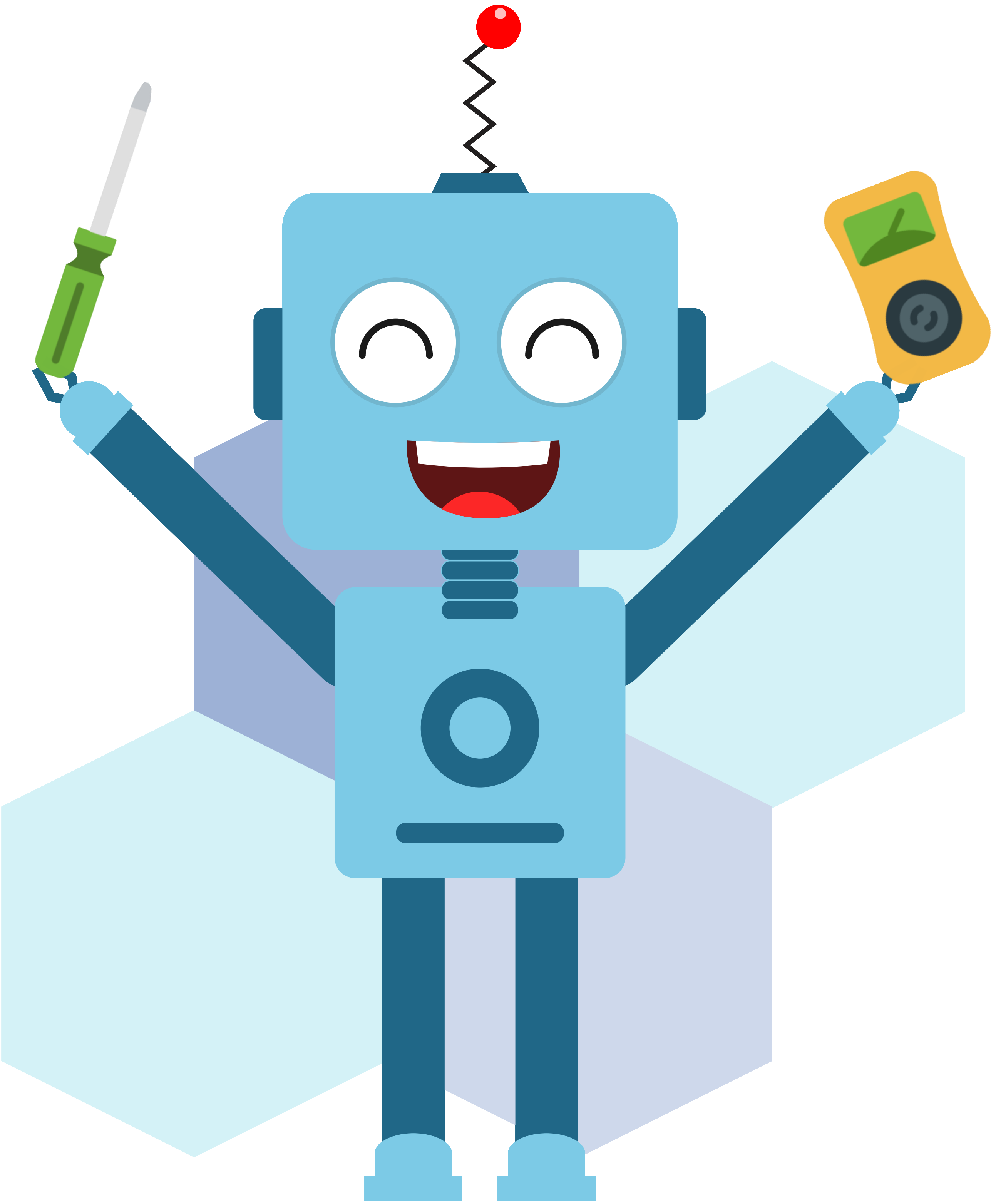
Addition Bot

Let us create an addition bot to calculate the sum of two numbers in Python.

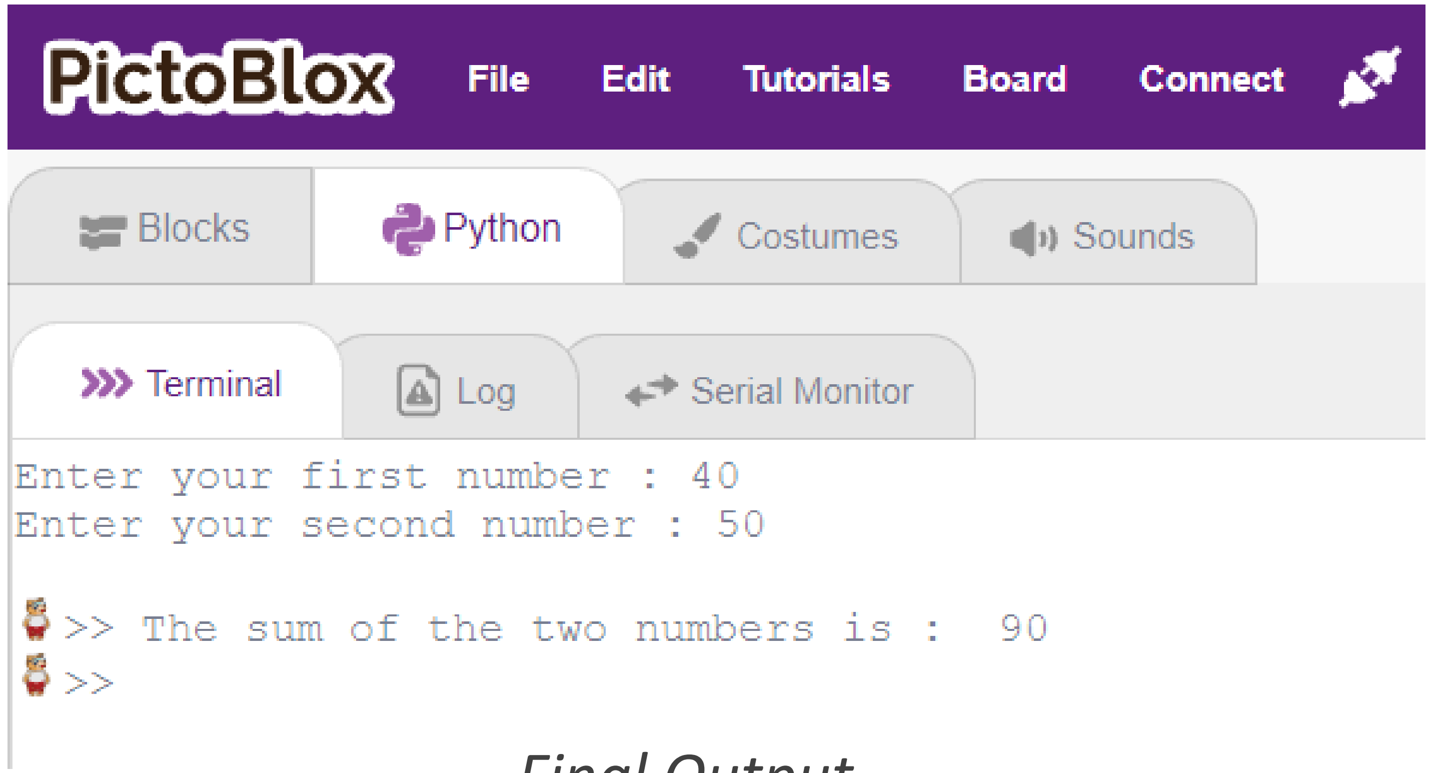
Follow the steps below:

- Open PictoBlox and create a new file from the menu-bar.
- Select the coding environment as Python Coding.
- Then user will enter their first number. The input() function reads the user's input as a string, and int() function converts it to an integer. This integer is then assigned to the variable x. and user will enter their second number.
- The input() function reads the user's input as a string, and int() function converts it to an integer. This integer is then assigned to the variable y.
- Now we will add x and y together, and assigns the result to the variable sum.
- Finally, we will use the print() function to display the result of the addition operation. The string "The sum of the two numbers is: " is displayed first, followed by the value of sum.
- Press Run to run the code.



Lets Code

```
#Here we will create an addition calculator where we will add two numbers given by the user.

#First let us initialise the two variables where the user input numbers will be stored

#The input function helps in receiving and storing the user entered number into the variable x

x=int(input("Enter your first number : "))

#The int function converts the string input (alphanumeric) into numerical form (integer)

y=int(input("Enter your second number : "))

#Now we will calculate the sum

sum=x+y

#Here we will print the sum

print("The sum of the two numbers is : ",sum)
```



```
Enter your first number : 40
Enter your second number : 50

>> The sum of the two numbers is :  90
>>
```

Final Output

ACTIVITY

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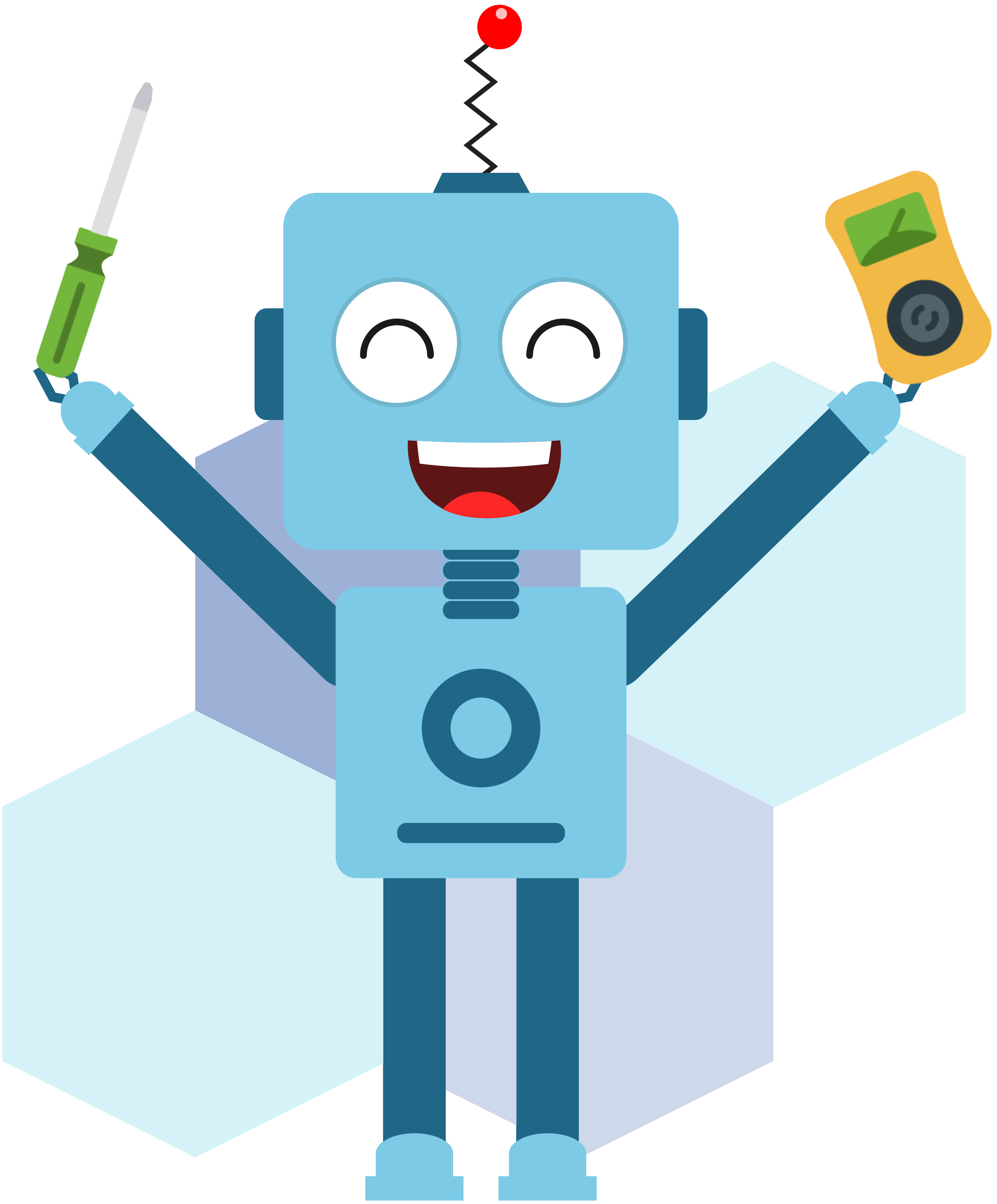
Multiplication Bot

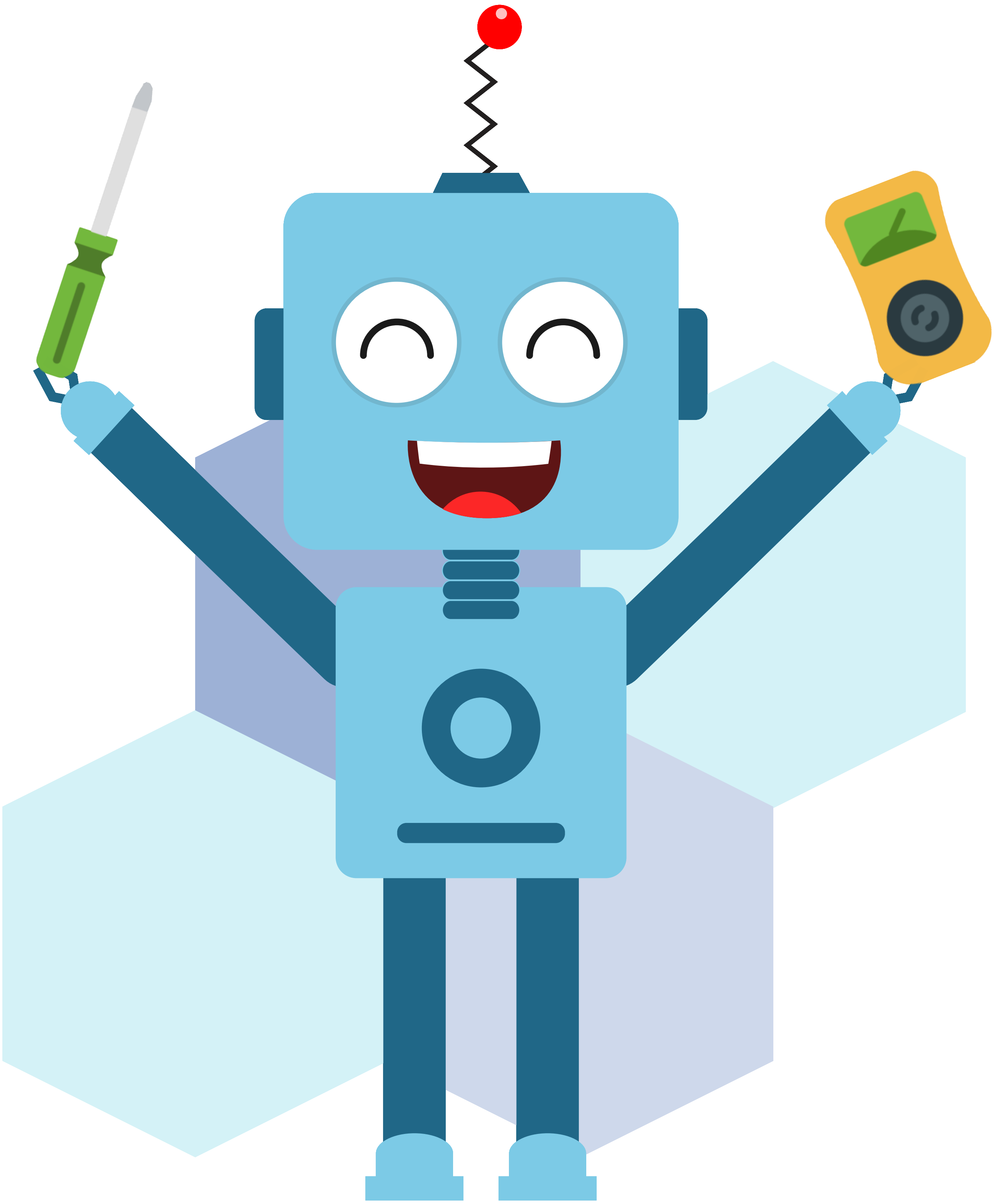
Let’s write the code to make Multiplication bot using PictoBlox.
Follow the steps below:

- Open PictoBlox and create a new file from the menu-bar.
- Select the coding environment as Python Coding.
- First the user to enter a number by displaying the message "Input the first number: ". The input function takes the user's input as a string and returns it. The int function then converts the user's input from a string to an integer (whole number) data type and assigns it to the variable num1.
- Then the user to enter another number by displaying the message "Input the second number: ". The input function takes the user's input as a string and returns it. The int function then converts the user's input from a string to an integer data type and assigns it to the variable num2.



Multiplication Bot

- Furthermore, we use string formatting to print the string "{} multiplied by {} is equal to {}" with the values of num1, num2, and mul inserted into the curly braces {}. The format function is used to insert the values into the string in the correct order. When the code is run, this line will output a message that tells the user what numbers they input and what the result of multiplying them is. For example, if the user entered 5 and 7 as the numbers, the output would be "5 multiplied by 7 is equal to 35".
- Press the Run button to test the code.



Final Code

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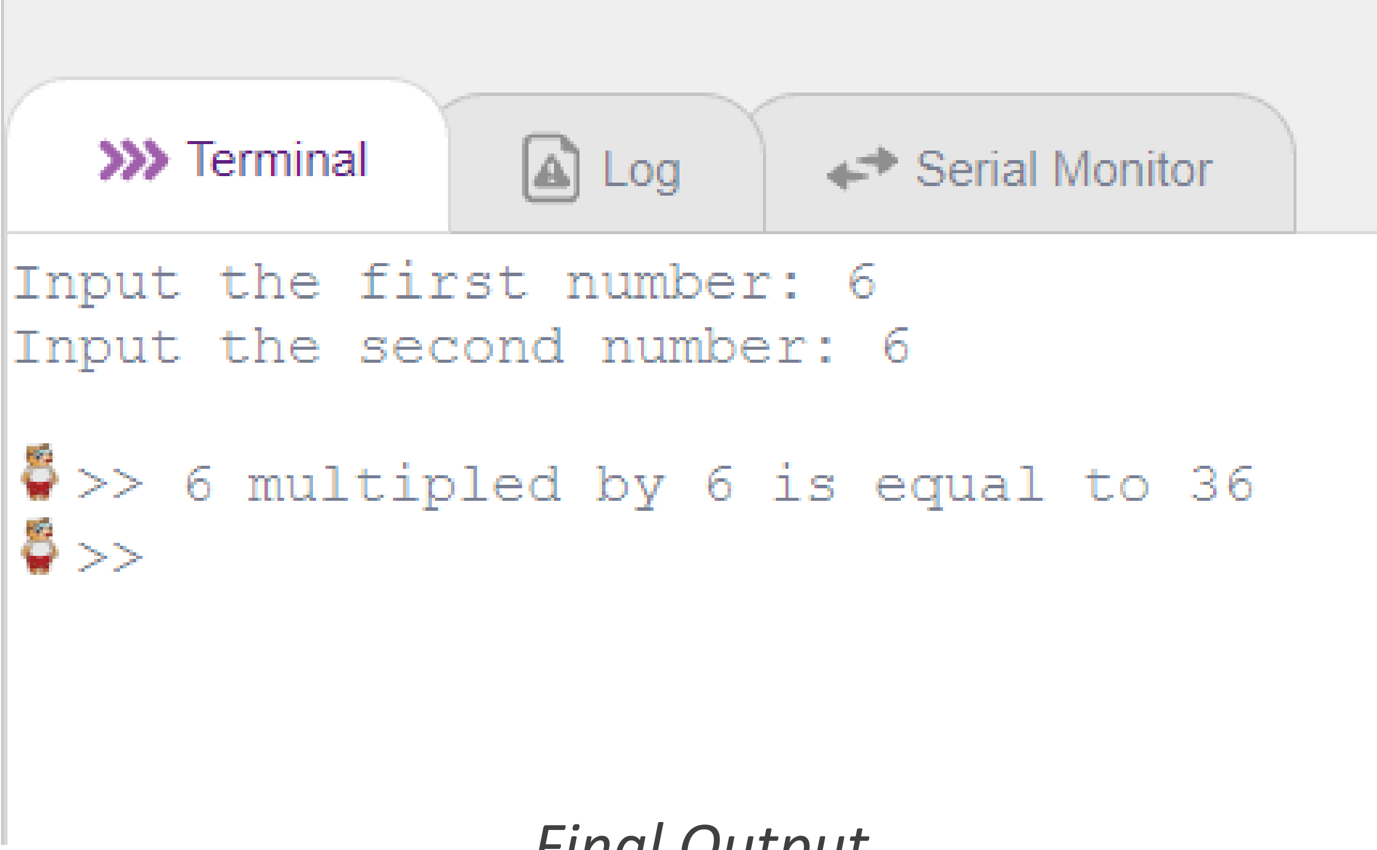
```
#Taking two numbers from the user

#"int" stands for integer data type

num1=int(input("Input the first number: "))

num2=int(input("Input the second number: "))


#Multiply them

mul= num1*num2

print("{} multipled by {} is equal to {}".format(num1,num2,mul))
```



```
Input the first number: 6
Input the second number: 6

>> 6 multipled by 6 is equal to 36
>>
```

Final Output

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