

**CL-1002**  
**Programming**  
**Fundamentals**

**LAB - 01**  
**Problem solving with sequential**  
**structure using Scratch**

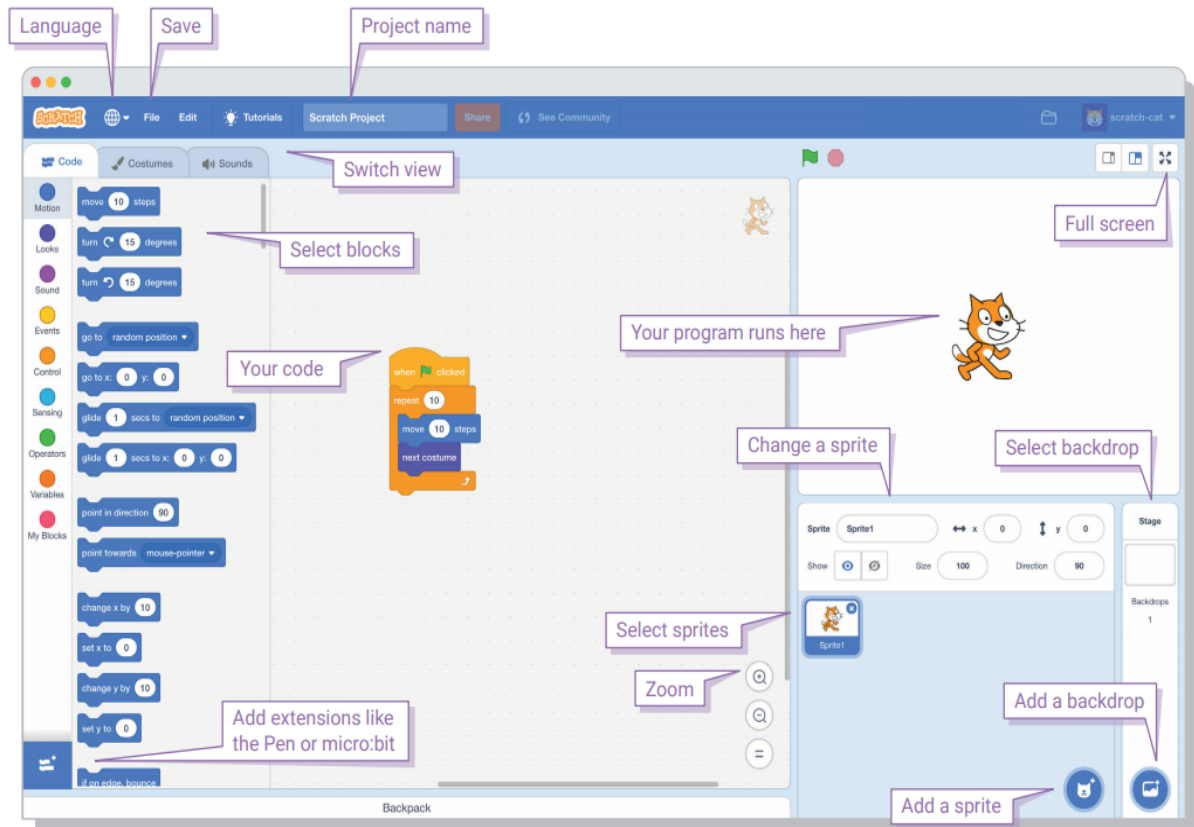
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NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES  
Fall 2023

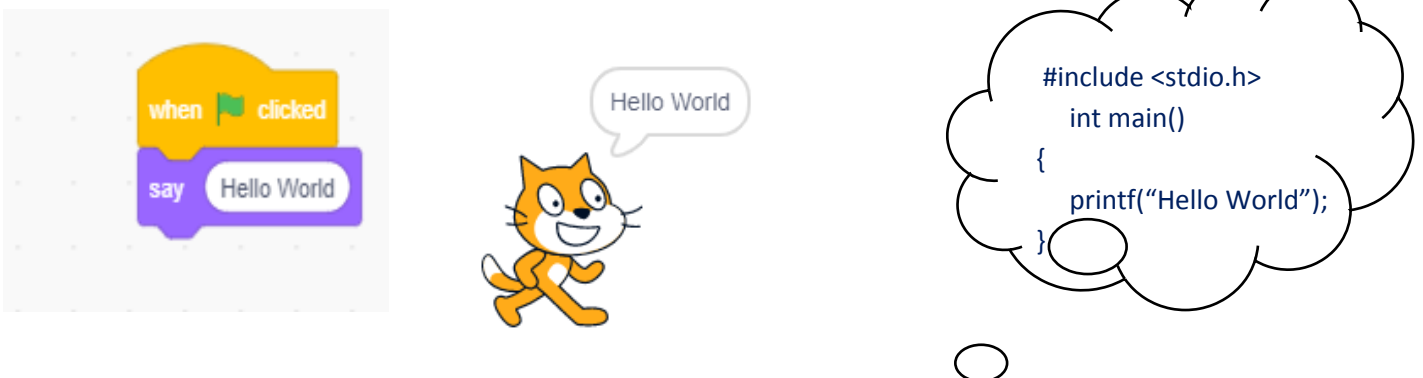
## Introduction

Visual Programming Language (VPL) is an application development environment designed on a graphical block-based programming model.

## Scratch Interface

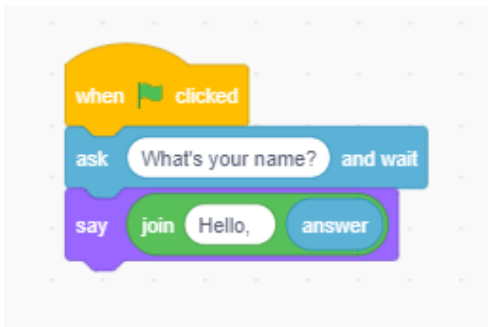


**Example#1: Writing our first script in a scratch to print “Hello” to the world.**

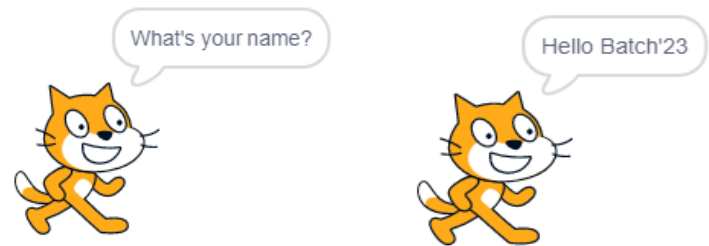


**Example#2: Prompting your Name and printing “Hello” to your Name.**

### Script:

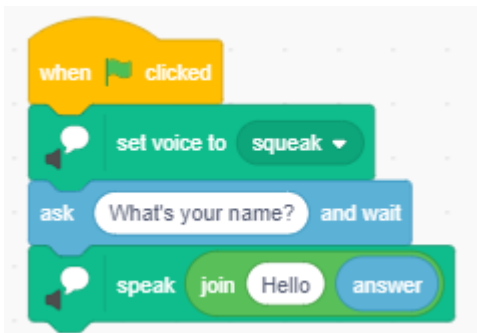


### Output:



**Example#3: Asking your Name and saying by speaking “Hello” to your Name.**

### Script:

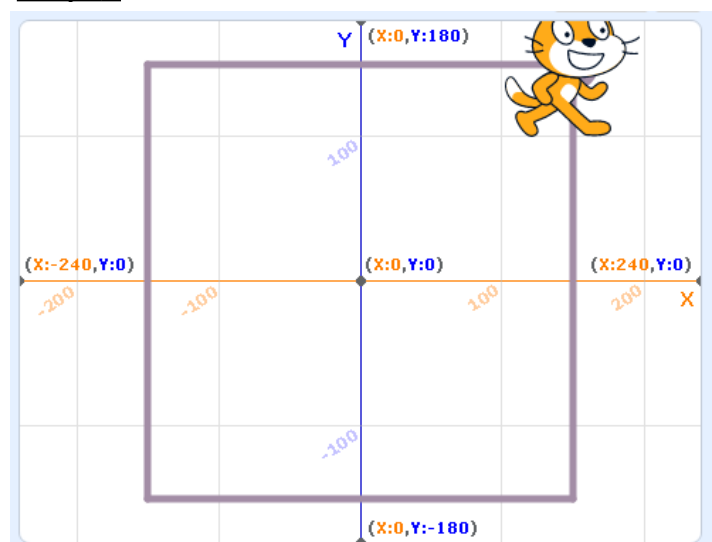


**Example#4: Setting Grid Backdrop and moving spirit onto the xy-axis and draw square on the screen.**

### Script:

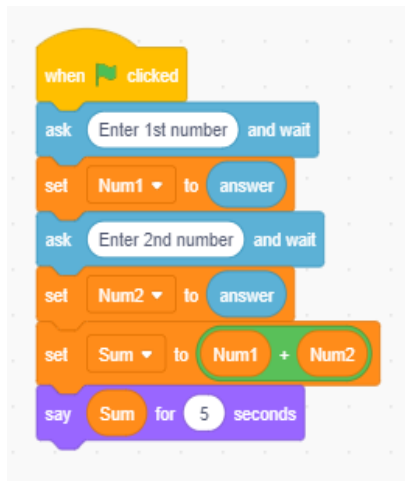


### Output:



**Example#5: Write a script of input two numbers, add two numbers and print the sum of numbers.**

**Script:**

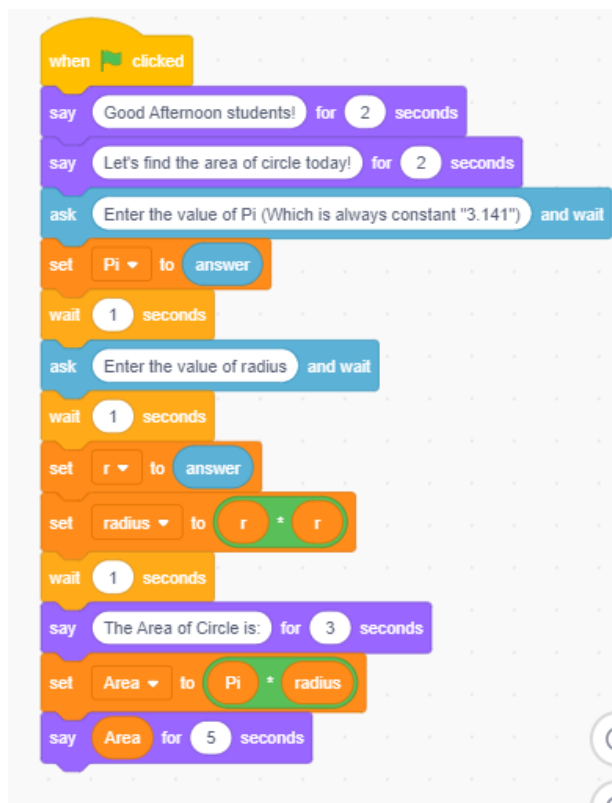


**Output:**

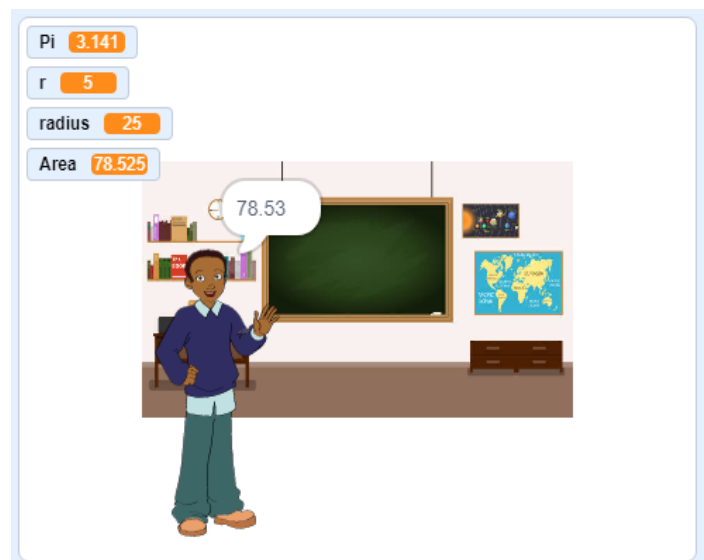


**Example#6: Write a script to find an area of circle**

**Script:**

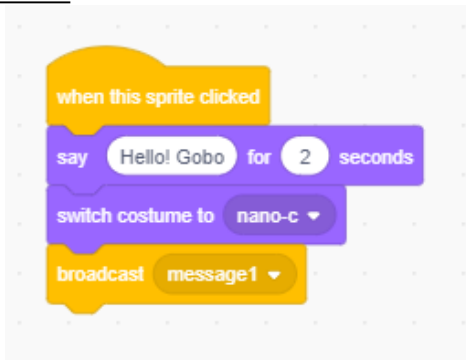


**Output:**

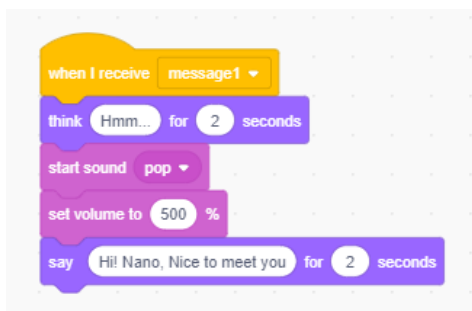


## Example#7: Conversation between two scripts when clicked on the spirit.

### Spirit#1



### Spirit#2



## EXERCISE#1

### QUESTION#1

Make a simple calculator which performs basic arithmetic operations of mathematics such as addition, subtraction, division and multiplication using scratch.

### QUESTION#2

Ahmed's ball container is 20 centimeters tall, 10 centimeters long and 10 centimeters wide. Find the volume of container using scratch.

### QUESTION#3

Calculate the hypotenuse of a right angled triangle with given two sides using scratch.

### QUESTION#4

A Fat Brain pipsquigz is on sale for 20% off the original price. The original price is Rs. 1500. Using scratch calculate and print the sale price.

### QUESTION#5

A bus leaves the university to take students on a field trip. The bus travels 10 kilometers south, 10 kilometers west, another 5 kilometers south and 15 kilometers north with the fuel consumption of 2 liters/km. Using scratch calculate how many kilometers it has covered and how much fuel it has consumed on a field trip?

### QUESTION#6

For 4 weeks, Ali volunteered as a helper for swimming classes. The first week, he volunteered for 8 hours. He volunteered for 12 hours in the second week, and another 12 hours in the third week. The fourth week, he volunteered for 9 hours. Using scratch calculate how many hours did he volunteer per week, on average?

### QUESTION#7

Famous math's Square roots can also be used to find the distance between two points in a 2-dimensional or 3-dimensional system for movie or video game production. We have the formula for the distance D between two points  $(x_1, y_1)$  and  $(x_2, y_2)$  in 2 dimensions which is given by:

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Find the distance D using scratch.

