CL-118 Programming Fundamentals

LAB - 01

Problem solving with sequential structure using Scratch

NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES
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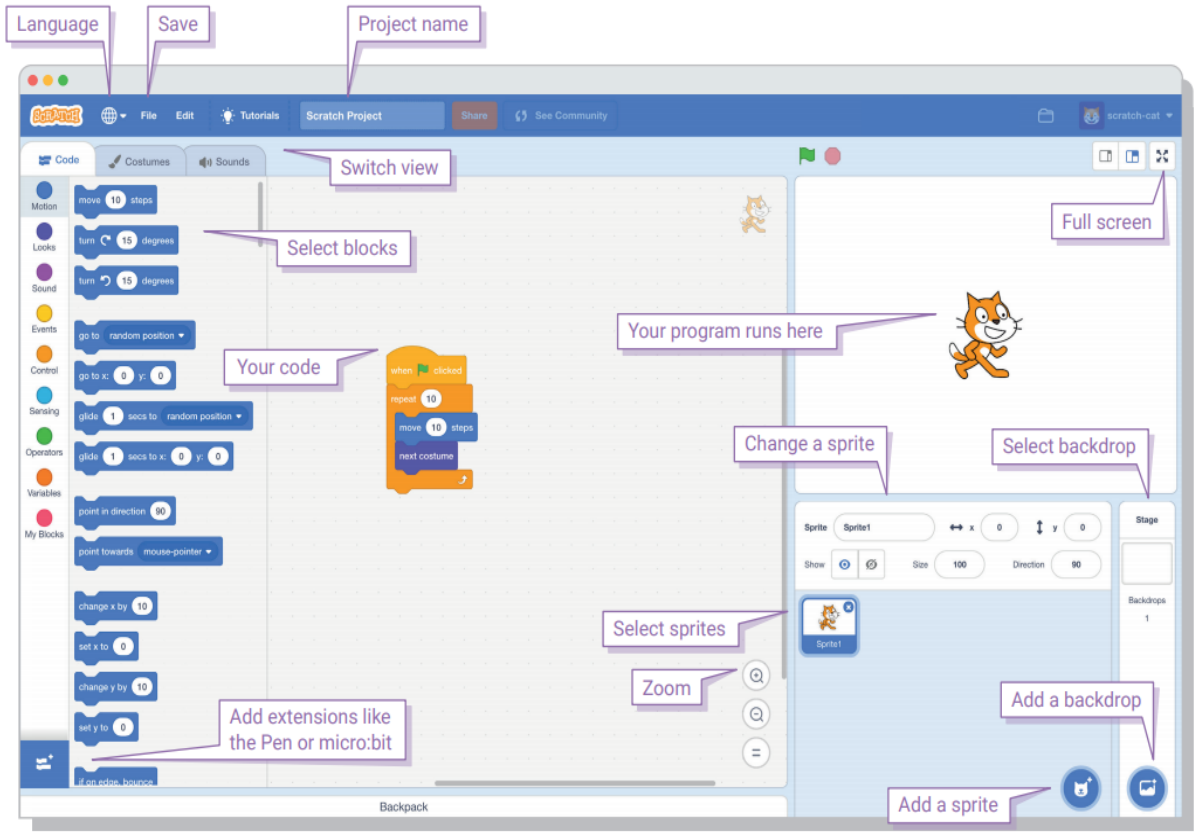
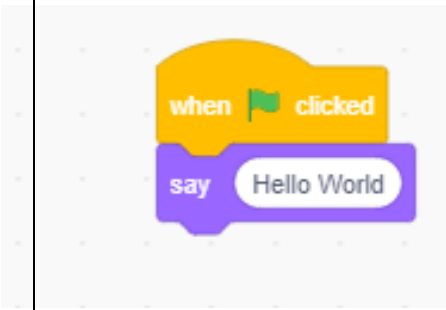
Introduction

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

Scratch Interface



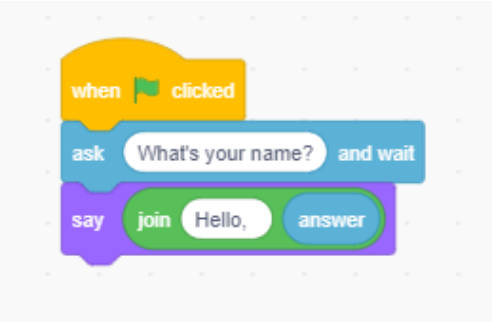
Example#1: Writing our first script in a scratch to print "Hello" to the world.



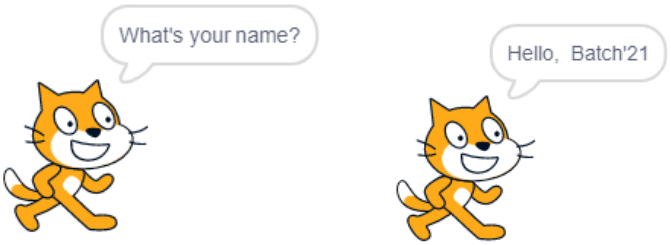
```
#include <stdio.h>
   int main()
{
   printf("Hello World");
}
```

Example#2: Prompting your Name and printing "Hello" to your Name.

Script:

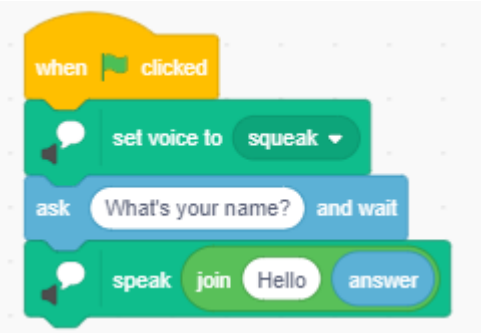


Output:



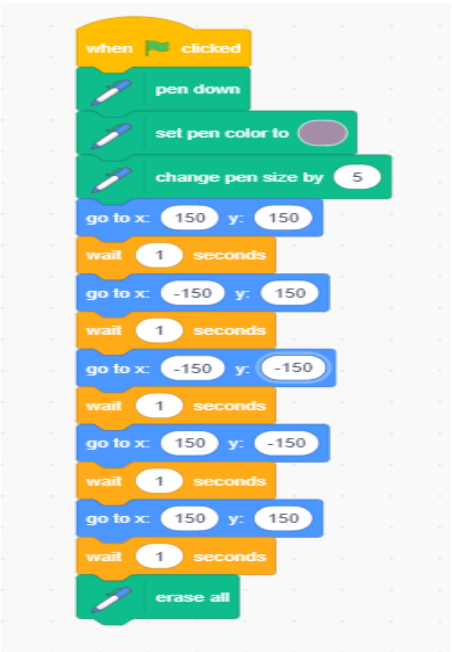
Example#3: Asking your Name and saying by speaking "Hello" to your Name.

Script:

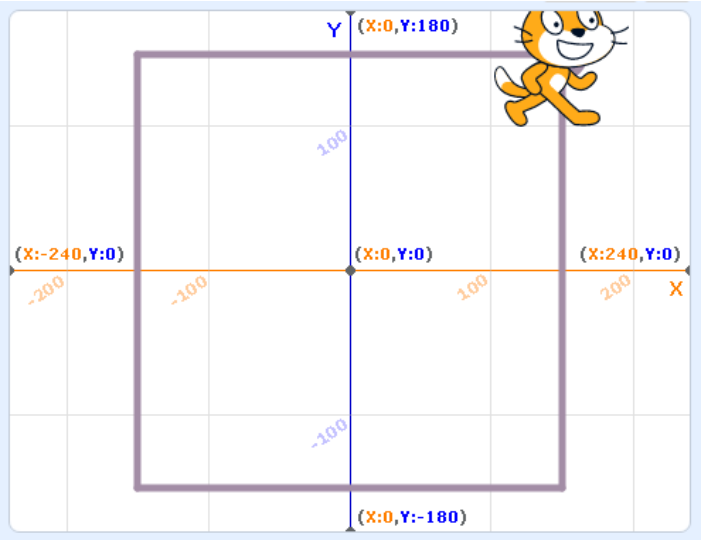


Example#4: Setting Grid Backdrop and moving spirit onto the xy-axis and draw square on the screen.

Script:

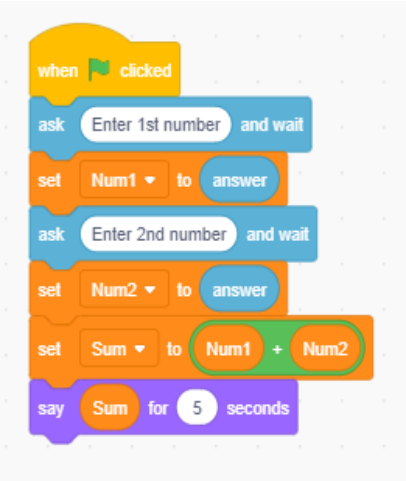


Output:



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

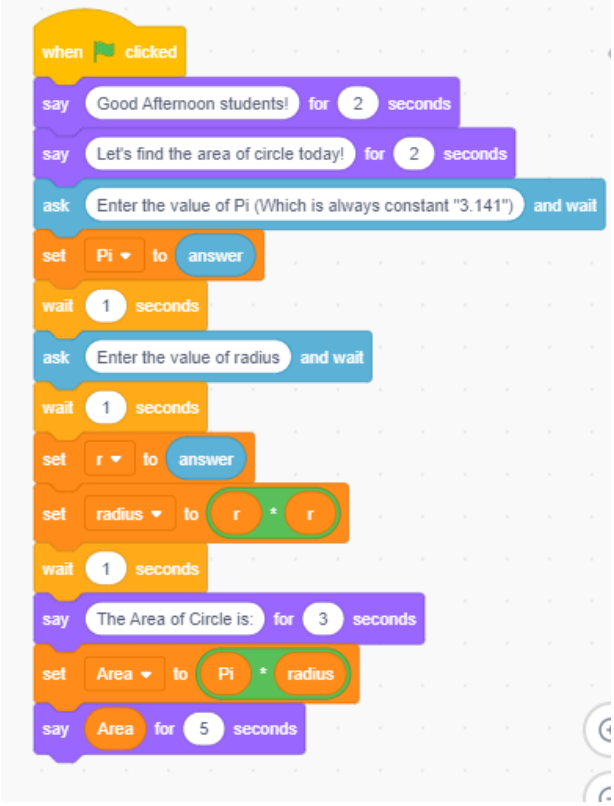
Script:



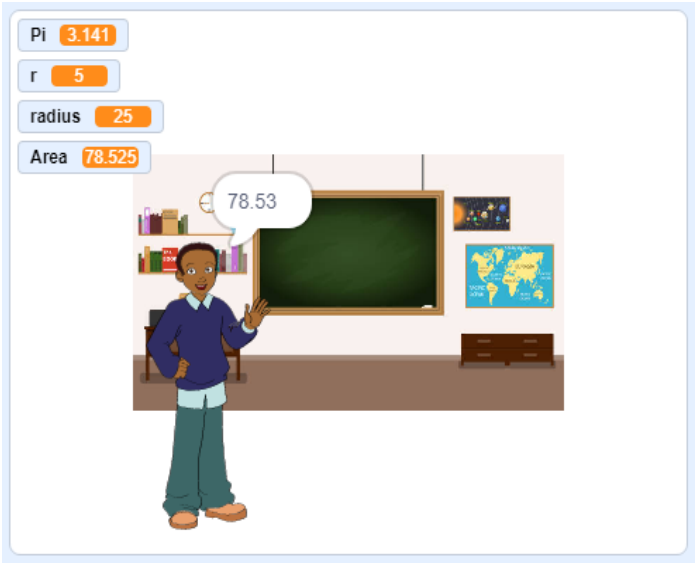
Output:

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

Script:

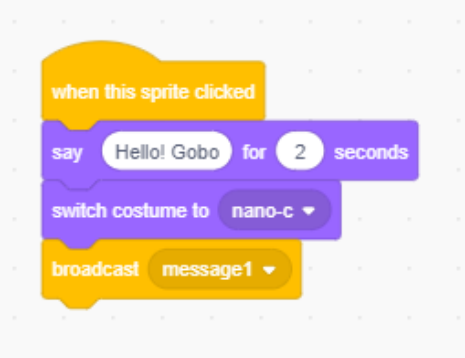


Output:

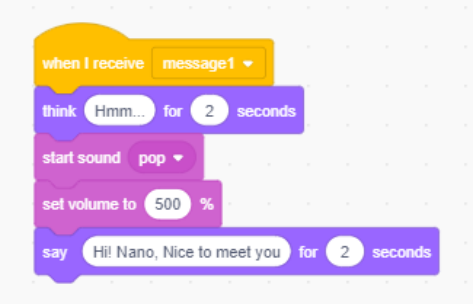


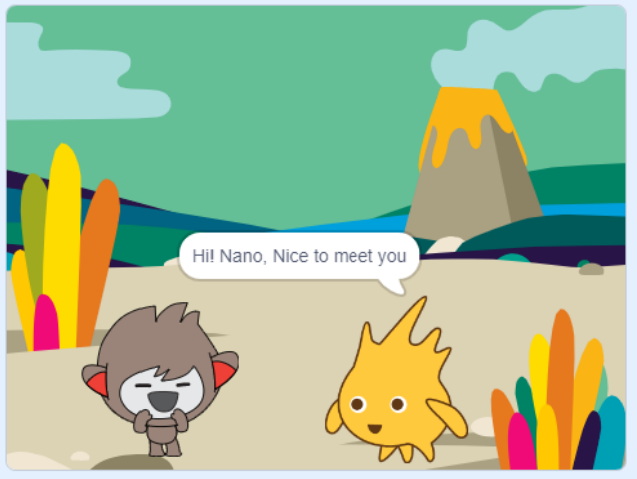
Example#7: Conversation between two scripts when clicked on the spirit.

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

QUESTION#3
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#4
Calculate the area for a triangle in which user inputs height and length of a triangle using scratch.

QUESTION#5
Ali's candy container is 20 centimeters tall, 10 centimeters long and 10 centimeters wide. Bilal's container is 25 centimeters tall, 9 centimeters long and 9 centimeters wide. Find the volume of each container using scratch. Based on volume, whose container can hold more candy?

QUESTION#6
Find out coordinates of midpoint using given formula, derived from Pythagorean Theorem and value of X by Quadratic formula using scratch, as follows:

a. Midpoint= $((x_2+x_1/2), (y_2+y_1/2))$

b. $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ Given (a≠0.)

QUESTION#7
For 4 weeks, Waseem 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#8
A sweater is on sale for 25% off the original price. The original price is Rs. 5000. Using scratch calculate and print the sale price.

QUESTION#9
One of the jobs that Joe Roberts has been given at work is to order special paper for a report for a board meeting. The paper comes in reams of 500 sheets. He always makes five more copies than the number of people that will be there. Joe wants to know how many reams of paper he needs for a meeting. He can order only whole, not partial, reams. Assume the required number of pages will not equal an exact number of reams. Test your solution using scratch with the following data:

The report is 140 pages long.
There will be 25 people at the meeting.