

## STEP BY STEP: LESSON PLAN ON SCRATCH PROGRAMMING

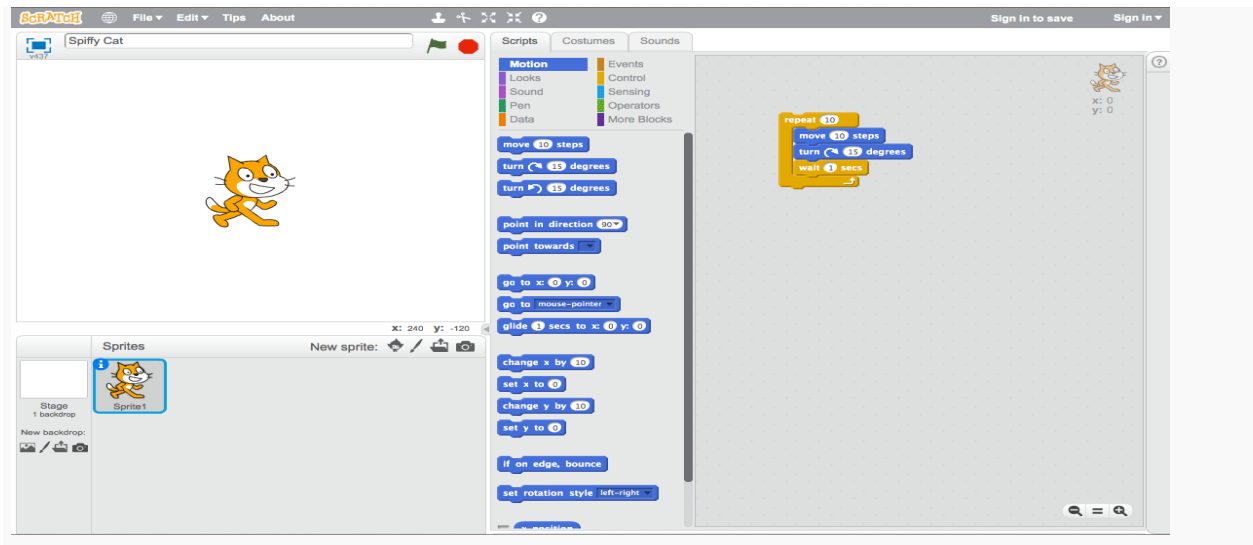
### BACKGROUND:

The ability to code computer programs is an important part of literacy in today's society. When people learn to code in Scratch, they learn important strategies for solving problems, designing projects, and communicating ideas. With Scratch, you can program your own interactive stories, games, and animations as well as share your creations with others in the online community.

Scratch is a simple programming environment designed for kids aged 8 to 16. It uses the drag and down interface to build programs that is, instead of typing lines of text, as you do with traditional coding, you drag colored blocks and join them together to build programs.

As shown in the figure the main features displayed on the scratch window include:

- ✚ **The Stage:** A large white rectangle in the top-left corner where all the animation appears.
- ✚ **The Sprites Window:** The region below the stage which contains the list of sprites (animated images) that you're using in your current project.
- ✚ **The Block Palette:** This region contains all the programming blocks that you can use in your programs. They are arranged into categories including motion, looks, control and so on.
- ✚ **The Scripts Area:** This is the large rectangle on the right-hand side that contains your scripts (computer programs). Blocks are dragged from the Block Palette into the Scripts Area to build your scripts.



**TIME ALLOWED:** 90 minutes

## CLASS OUTCOME

By the end of this lesson, students will learn the following:

- ✚ Understand and appreciate computer programming/coding as a basic tools in our present society
- ✚ learn to think creatively, reason systematically, and work collaboratively
- ✚ Learn how to program by creating simple animations using computer code with scratch to tell stories, create games and share ideas.
- ✚ Create simple programs that will help them develop a range of coding and problem-solving skills and also help them when they later move onto real-world programming.

## MATERIAL(s):

- ✚ A computer or mobile phone with scratch installed

## INTRODUCTION (5 minutes)

Start by asking the students the following questions and allow them to give you answer before introducing them to what computer programming is.

- ✚ What is computer programming? Comment: computer programming is simply writing a set of codes or commands that allows you to perform a specific task.
- ✚ Why do we need to learn how to program? Comment: programming is tool in our everyday activity with applications in almost all fields ranging from agriculture, technology, science, medical, art and so on.
- ✚ What programming languages and skills do you know or have heard about? Comment: programming languages include JavaScript, Java, BASIC, FORTRAN, C++, HTML etc.
- ✚ Have you heard of scratch programming? If you have, what is it about? Comment: scratch is programming platform that teaches beginners how to code in a fun way by using simple animations.

**ACTIVITY** (50 minutes): Activity is subdivided into stages

**Stage 1** (15 minutes): In this stage the students will learn how to change costume and background, select sprite (animated objects) and make use of commands from Motion and Looks categories from the Block Palette.

**To change background:**

- ✚ click on the white rectangle shape named stage
- ✚ click on import and select from options
- ✚ click ok

**To change costume:**

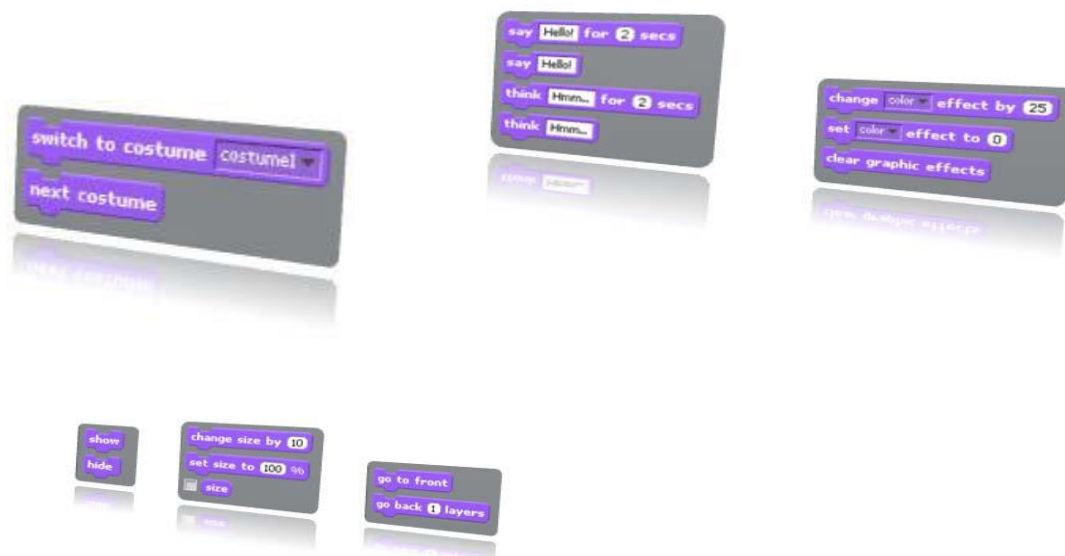
- click on the cat sprite
- click on import
- select from options and click ok

Note: you can select more sprite and background by using same method. Also you can change the name of sprite to a more suitable name.

**Using commands from Motion category:** This category introduces the commands that allow the sprite to move forward/backward, rotate sprite clock/anticlockwise and position sprite in any direction and so much more. Examples of commands to explore here are shown below



**Using commands from Looks category:** This category introduces the programming blocks that allows you to switch between costume and backgrounds, display a speech/thought bubble with its corresponding message. The message is presented permanently or for fix duration of time. It allows you to set or change graphic effects applied to sprite, change size of sprite, show/hide sprite on stage, move sprite in front other sprite.



**Stage 2 (10 minutes):** Students will learn how to use commands from the Sound and Pen categories from the Block Palette.

**Using commands from Sound category:** This lesson introduces the programming blocks that allow you to play sounds, drums and instruments associated with the sprite while you either continue with other actions or wait until the sound ends. It also introduces the control to stop all sounds.



**Using commands from Pen:** this block allow us to put the pen down, and therefore draw as it moves, or to move the pen up, disabling the pen from marking as it moves. The clear block removes all the pen marks from the Stage. It also introduces the programming blocks that allows us to set or change the pen color, set or change the shade of the pen, set or change the pen size and to stamp on the stage images of the sprite.



**Stage 3 (15 minutes):** students will learn how to navigate between sprites by making use of commands from Control, Sensing and variables categories of the Block Palette.

**Using commands from control category:** The blocks presented on this category allows us to activity the sprite either by clicking on the green flag, clicking on the sprite or clicking on any key in the keyboard based on chosen option, it also allows you to wait for a predefined time before performing an action which helps to navigate between sprites actions and many more. Here are some command options from the control,



**Using commands from sensing category:** these blocks helps you to receive information about the location of the mouse coordinates, x and y, it tells you if one sprite is touching another sprite, the distance of one sprite to another or to the mouse pointer and many more.



**Using commands from variables:** This presents the programming blocks allows you to know the current time of the timer in seconds as well as the current volume of the sound and allows you to reset. Here are few commands from the variables



Stage 4 (10 minutes): students will learn how to use commands from the operators category  
 Using commands from the operator: These blocks allow you to perform arithmetic operations such as the division, addition, subtraction and multiplication. It allows you to generate random numbers, compare numbers and use the logic operations.



Note: using and combining more of these commands from the different categories helps the students to better understand the program and build more competent skills

#### **DISCUSSION** (5 minutes)

Find out what each student has learnt; how useful is this program to them, what their challenges with the program is and how you can help them better understand the program.

#### **GROUP PROJECT** (25 minutes)

After studying the tutorials the students will replicate on their own Scratch environment the activities presented during the lesson. The students are encouraged to explore, beginning with the environment presented in the tutorials, all the possibilities open by the newly learned concepts.

Divide the students into groups with at most four (4) students in each group, give each group access to a computer and task each group to create and build programs based on storytelling and games using commands from at least four (4) categories in the block palette.

**To Launch your project online:** register on MIT code lab and upload your project to the site for everyone to see and you can also get more information and ideas on how to develop your scratch skills from this site.

#### **CLOSING REMARKS AND EVALUTION OF STUDENT PROGRESS** (5 minutes)

Rate the performance of your students from a range of 5 – 1 (5 as excellent and 1 as poor). Keep the track of the record from this program for future references.