CHAPTER 8

# INTRODUCTION TO SCRATCH

LEARNING IN THIS CHAPTER

- Scratch - A simple language
- Starting Scratch
- Main components of Scratch
- Moving a Sprite
- Drawing a colourful circle
- Making a duplicate copy of Sprite
- Saving a Scratch project
- Opening a Saved project

Students! How do you express your feelings to your family and friends? Through language, isn't it?

A language is a medium to talk or write. You may speak different languages, like Hindi, English or any other regional language, but to talk to any person, you need a common language, which both of you can speak and understand.

In the same way, if you want to give instructions to a computer, you need to learn the language that a computer understands. A computer does not understand the language that we speak. It understands only few special languages of its own. These are known as **Programming Languages**.

**A programming language has a set of instructions, using which you can make a computer do any activity that you want.**

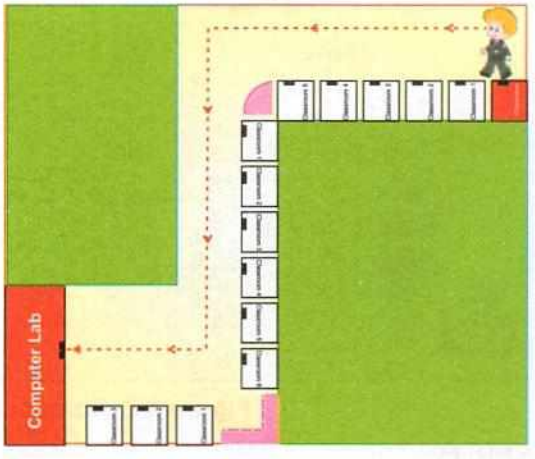
## SCRATCH - A SIMPLE LANGUAGE

Scratch is one of the easiest computer languages. Students can use Scratch to create their own games, animated stories, and projects with great ease.

Any task that we perform includes many steps. It should be completed, step-by-step, in a particular sequence.

Example

Suppose Kabir's teacher asks him to bring notebooks of his class from the Computer lab. As he is new in the school, she guides him how to reach the Computer lab. She gives the following instructions to Kabir:




- Move to the left from the class and go straight.
- After crossing five classes, take a left turn.
- Then, move forward and after crossing six classes, take a right turn.
- After crossing three classes, you will reach the Computer lab.

Likewise, a computer also follows step-wise instructions to complete any task. These step-wise instructions are known as a **Program**.

## STARTING SCRATCH

To start Scratch, follow the steps given below:

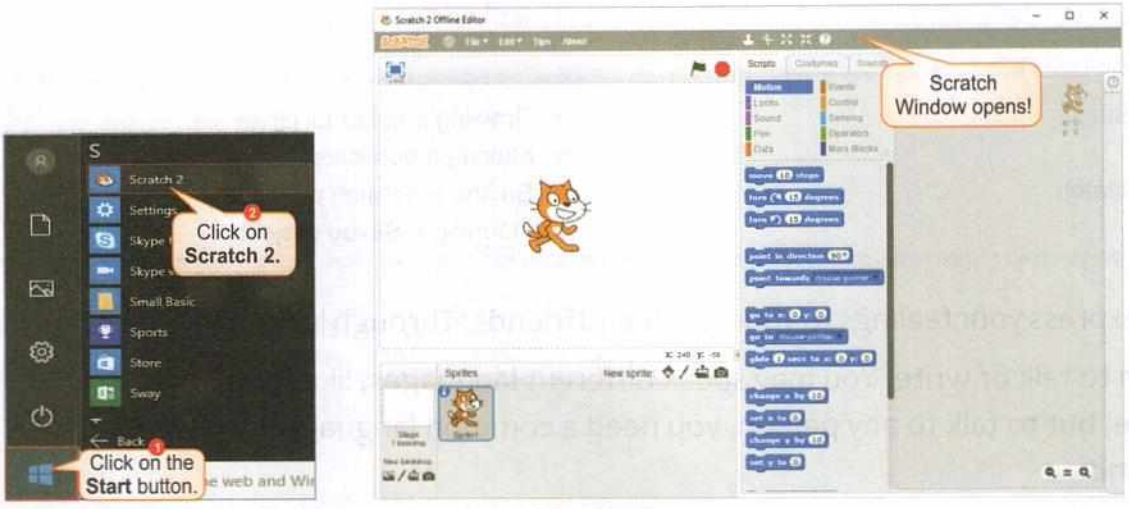



**Figure 8.1:** Starting Scratch

## MAIN COMPONENTS OF SCRATCH

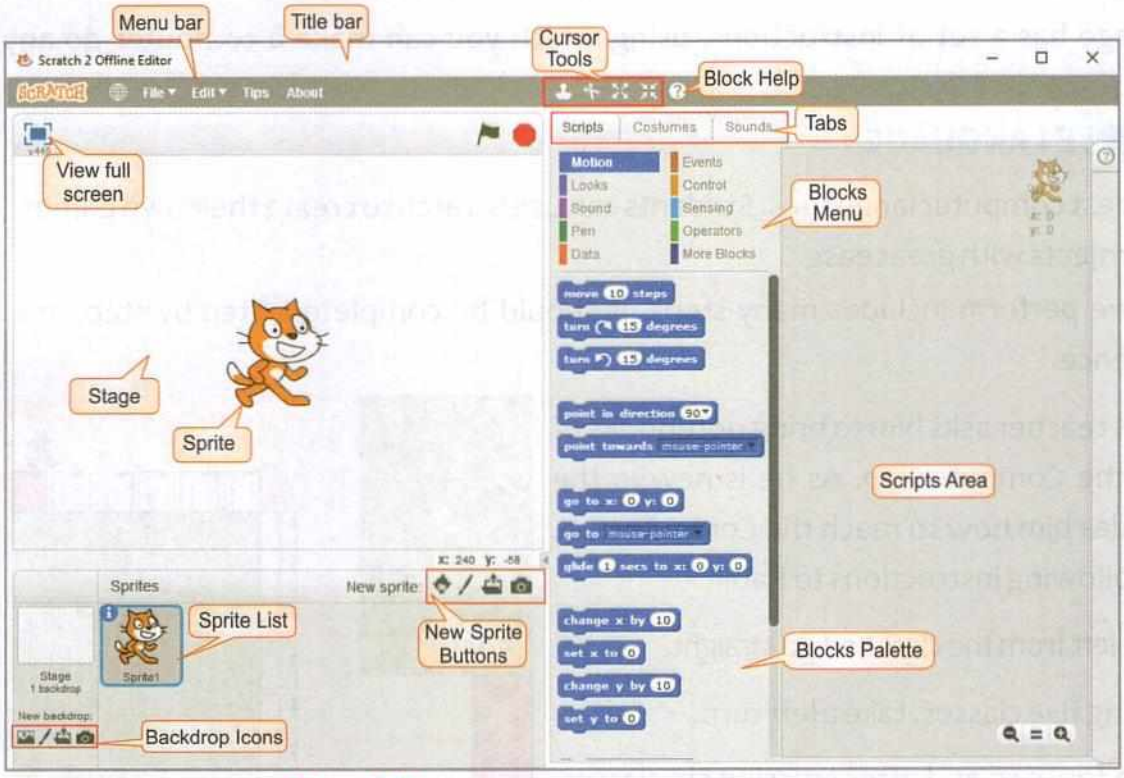



**Figure 8.2:** Components of Scratch Window

## SPRITE

Sprite is a small graphic character that performs actions in a Scratch project. Scratch provides a number of in-built Sprites. Cat is the default Sprite in Scratch.

### Fact File

Scratch was developed by the Lifelong Kindergarten Group at the MASSACHUSETTS INSTITUTE OF TECHNOLOGY(**MIT**) Media Lab, led by **Mitchel Resnick** in 2003.

### Let's Know More

Scratch 3.0 is the latest version of Scratch. It comes with a lot of exiting new features such as, dozens of new sprites, backgrounds and sound. It was released on 2nd January 2019.

### Know the Fact

Scratch is used in more than 150 countries and available in 40 different languages.

### Know the Fact

Scratch can easily run on different operating systems, including Windows, Mac OS, and Linux.

### Know the Fact

The official website of Scratch is : www.scratch.mit.edu

## STAGE

It is the main working area where the Sprite moves and performs actions, as per the given instructions. Here you can watch stories, play games, and run Scratch projects that you have created.

## BLOCKS PALETTE

The Blocks palette contains the set of blocks, which is used to program the Sprite and give actions to it. Each block performs specific tasks in a project. It is used to create scripts in Scratch. The blocks connect with each other just like a jig-saw puzzle.

## SCRIPT

A script is a collection of step-wise instructions that are given to a Sprite to do a specific task. A script consists of at least two blocks.

## SCRIPTS AREA

The Scripts Area is the place where you create a script for a Sprite to do a particular task. The script is created by dragging the instructions from the blocks palette and dropping them step-wise one below the other. A script is also called a **Program**.

Let us learn how to drag and drop the blocks in the Scripts Area:

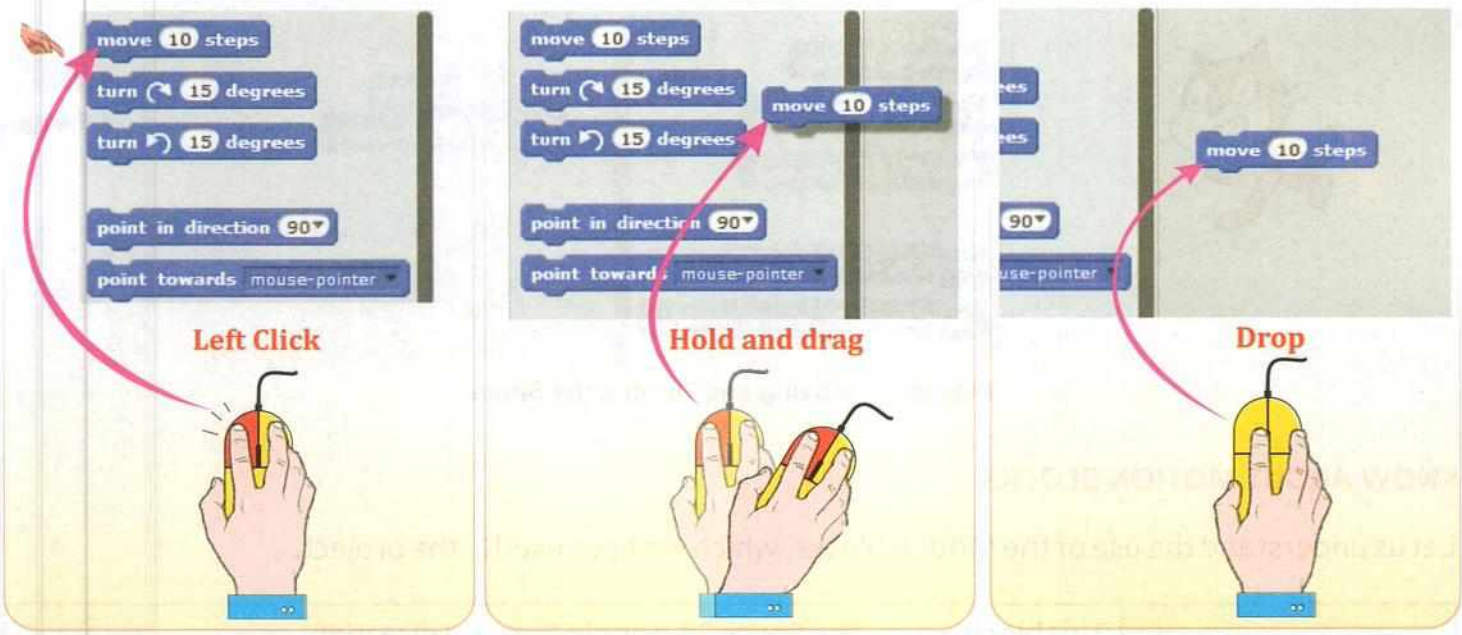



Figure 8.3: **Scripts Area**

## MOVING A SPRITE

All the instructions related to the movement of a Sprite are given under the **Motion** block menu.

Let us create a Scratch project to move the Sprite in circular motion.

- Open the Scratch window.
- By default, the **Motion** block palette is displayed on the left side of the Scratch window.
- Click on the move 10 steps block and drag it to the Scripts Area. Change the step number from 10 to 20 by typing in the number box. Click on the block. You will notice that the Sprite moves the specified number of steps.
- Click on the turn 15 degrees block. Now, drag and drop it on the Scripts Area. Place it below the move 20 steps block.
- Keep clicking on any block in the Scripts Area.
- Observe that the Sprite is moving 20 steps forward and turning 15 degrees in a circular motion on the stage.

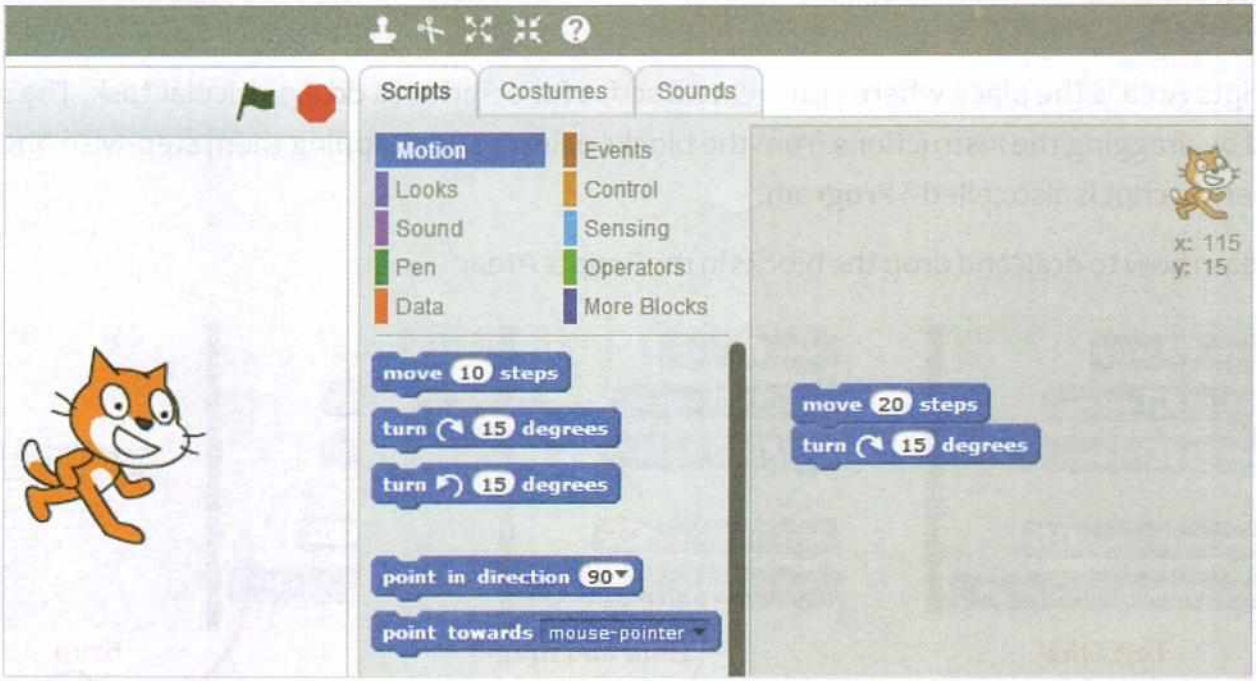



Figure 8.4: **Moving and Turning the Sprite**

## KNOW ABOUT MOTION BLOCKS

Let us understand the use of the Motion blocks, which we have used in the project.

| | |
|---|---|
| move 20 steps | This block moves the Sprite 20 steps in forward direction.<br>To move the Sprite in backward direction, type the number with a preceding (-) minus sign. For example, -20. |
| turn 15 degrees | This block is used to turn the Sprite in clockwise direction. To turn the Sprite in anti-clockwise direction, use turn 15 degrees block. |

## DRAWING A COLOURFUL CIRCLE

The blocks in the **Pen** block menu allow the Sprite to draw lines on the stage, change the colour, and the thickness of lines. Let us add some more blocks to the previous Scratch project. Observe the movement of the Sprite on the stage.

- Click on the Pen block menu.
- Select the pen down block from the **Pen** block palette.
- Drag out the block and place it underneath the turn 15 degrees block.
- Now, click and pull the set pen size to 1 block onto the Scripts Area. Place it below the pen down block. Change the value from 1 to 10.


Figure 8.5: **Drawing a Colourful Circle**

- Drag out the change pen color by 10 block from the **Pen** block palette and drop it at the end. Change the value from 10 to 20.
- Keep clicking on any of the blocks in the Scripts Area till the Sprite completes its colourful circle.

### KNOW ABOUT PEN BLOCK

Let us understand the use of Pen blocks that we have used in the project.

| | |
|---|---|
| pen down | This block draws a line as the Sprite moves on the stage. |
| set pen size to 1 | This block is used to set the thickness of the pen to a specific number. You can change the thickness of the pen by typing in the number box. |
| change pen color by 10 | To change the colour of the pen, use change pen color by 10 block. |

## MAKING A DUPLICATE COPY OF SPRITE

To create a duplicate copy of the Sprite, the stamp block is used.

- Drag out the blocks from the **Motion** and **Pen** blocks palette as shown in Figure 8.6. Snap the blocks together onto the Scripts Area.


Figure 8.6: **Making Duplicate Copies of Sprite**

- Change the values of the blocks as given in Figure 8.6.
- Click on any of the blocks to create the duplicate copy of the Sprite.
- Notice, as the Sprite reaches the edge of the Stage, it will bounce back and change its direction.

| | |
|---|---|
| if on edge, bounce | The if on edge, bounce block is in the **Motion** block menu. It is used to turn the Sprite in the opposite direction as it reaches the edge of the stage. |

## SAVING A SCRATCH PROJECT

Once you finish the project, always save it before closing the Scratch window.

To save the project, follow the given steps:

- Click on the **File** menu in the Menu bar. Select the **Save** option from the drop-down list.
- The **Save Project** dialog box appears.
- Choose the desired location where you want to save your Scratch project.


Figure 8.7: **Saving a Project**

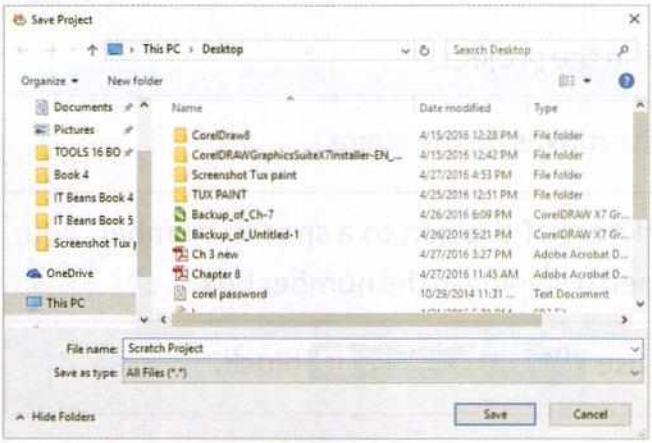



Figure 8.8: **Save Project Dialog Box**

- Assign a name to your project in the **File name** text box.
- Click on the **Save** button.
- Your Scratch project will be saved. You can open it whenever required.

**NOTE**

Scratch 2.0 projects are saved with the extension **.sb2**.

## OPENING A SAVED PROJECT

To open a saved project, follow the given steps:

- Click on the **File** tab. Choose the **Open** option from the drop-down list.


Figure 8.9: **Opening the Scratch Project**

- The **Open Project** dialog box appears.
- Select the project that you want to open.
- Click on the **Open** button.
- The selected project opens in the Scratch window.

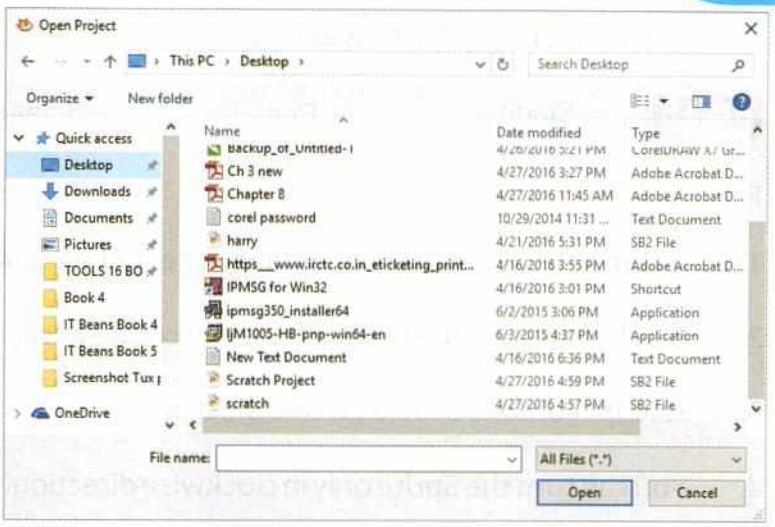



**Figure 8.10: Open Project Dialog Box**

## RECAP

- A computer understands only a few special languages of its own. These are known as programming languages.
- Scratch is one of the easiest computer languages.
- Students can use Scratch to create their own games, animated stories, and projects with great ease.
- Sprite is a small graphic character that performs actions in a Scratch project.
- Script is a collection of step-wise instructions that are given to Sprite to do a specific task.
- Scripts Area is the place where you create a script for a Sprite to do a particular task.
- All the instructions related to the movement of Sprite are given under the Motion block menu.
- The blocks in the Pen block menu allow the Sprite to draw lines on the stage, change the colour, and the thickness of lines.

## BRAIN DEVELOPER

### SECTION - A

**A. Fill in the blanks.**

1. ..... is one of the easiest computer languages.
2. A computer follows step-wise instructions to complete any task, which is known as .....
3. ..... is a graphic character which moves on the stage.
4. The blocks in the ..... block allow the Sprite to draw lines on the stage, change the colour, and the thickness of lines.

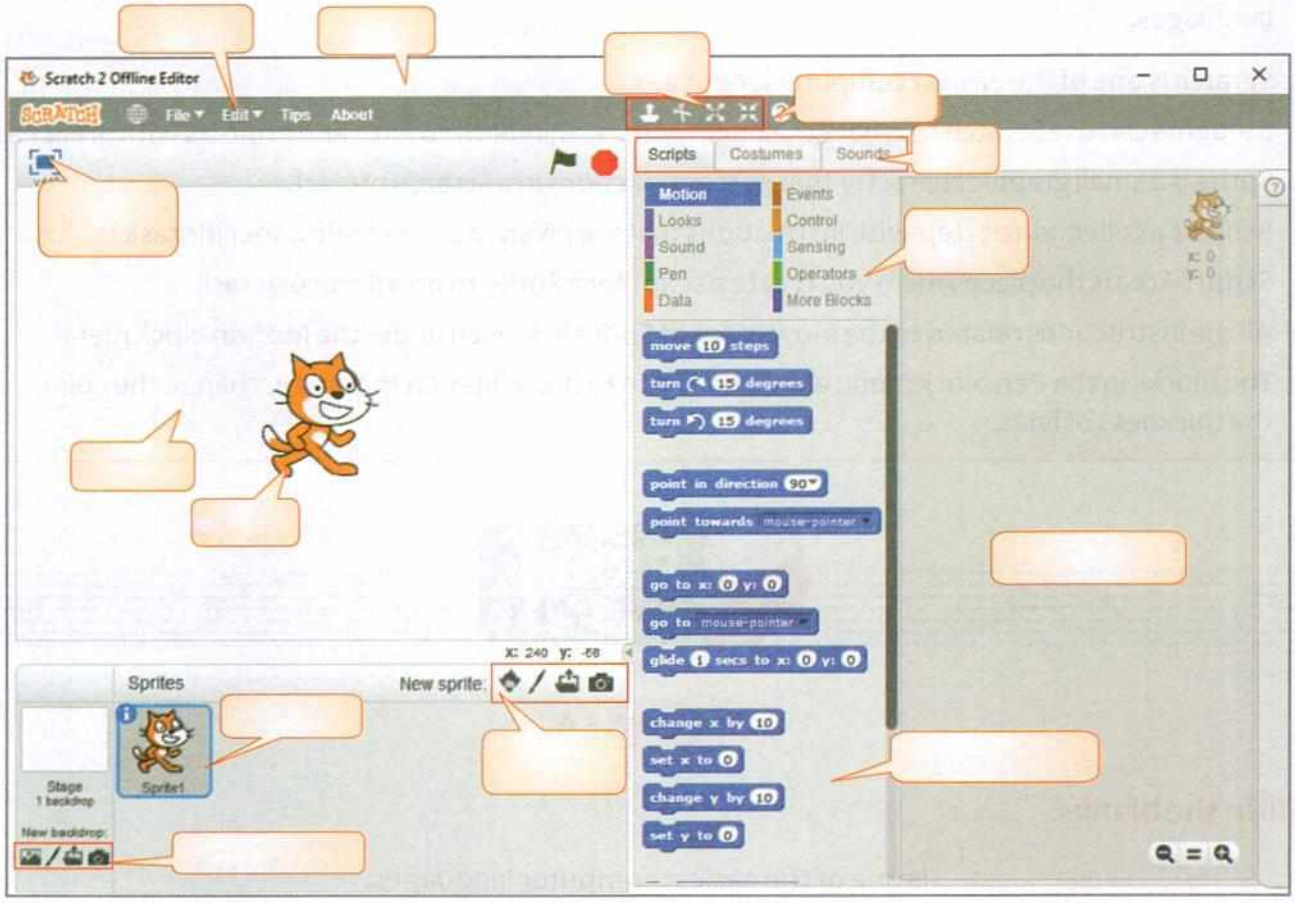
5. In Scratch, the Sprite moves on the ..... when you run a program.

**HINTS** • Stage • Pen • Scratch • Program • Sprite

## B. State True or False.

1. A computer understands the language that we speak.
2. Blocks Palette is the place where you create a script for the Sprite to do a specific task.
3. A script consists of at least two blocks.
4. You can turn the Sprite only in clockwise direction.
5. Scratch 2.0 projects are saved with the extension .sb2.

## C. Label the parts of the Scratch window.




## D. Application-based questions.

1. Aarav wants to make a Scratch project wherein he wants to move the Sprite in forward direction by 20 steps. Suggest him the appropriate block to perform this action.

.....

2. Shreya wants to change the thickness of the pen while drawing a trail behind the Sprite. Suggest her the right block that she can use.

.....

## SECTION - B

### A. Multiple-choice questions.

1. Scratch 2.0 was officially released on ..... 2013.

   a. July 4 b. May 9 c. June 2

2. ..... contains the set of blocks, which is used to program the Sprite.

   a. Blocks Palette b. Stage c. Scripts Area

3. ..... block draws a line as the Sprite moves on the stage.

   a. 

   b. 

   c. 


4. Who is the founder of Scratch?

   a. James Gosling b. Tim Berners-Lee c. Mitchel Resnick

### B. Answer the following questions.

1. What do you know about Scratch?

.....

.....

2. What is a Sprite?

.....

.....

3. Explain any two main parts of the Scratch window.

.....

.....

.....

4. What is the use of Pen block?

.....

.....

# ACTIVITY SECTION

## MY ACTIVITY

Learning While Playing

**The teacher asked the students to make a chart, displaying their daily routine of work, in correct sequence. Number the steps in the order in which they are done.**









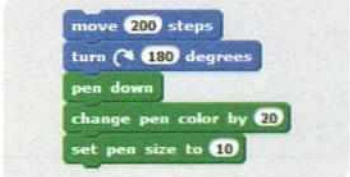




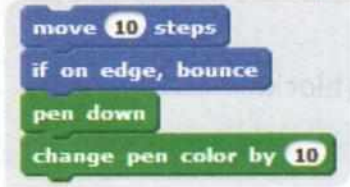
## LAB SESSION

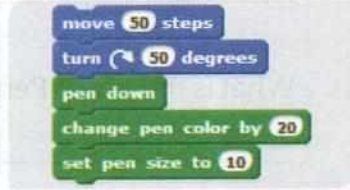
Perfection Through Practice

**A. Practice the following programs and see the change in the Sprite's movement.**







**B.**

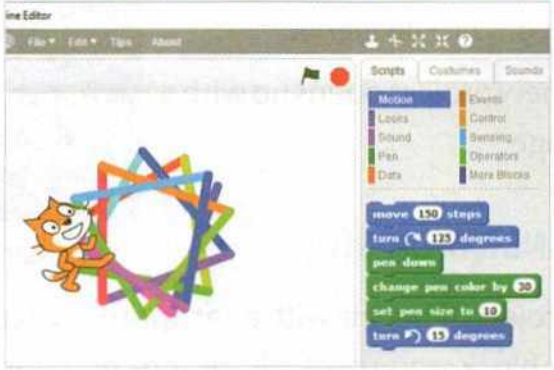
**(1) Drag the following blocks in the Scripts Area of the Scratch window and save the project.**


Modify the following blocks in your script and observe the difference while running the program again.

- Decrease the steps in `move 100 steps` block to 10.
- Remove `change pen size by 10` and `if on edge, bounce` blocks from the script.
- Add the block `turn 15 degrees` after `move 10 steps` and change the degrees to 30.

```
pen down
change pen color by 10
move 10 steps
turn 30 degrees
```

**(2) Drag the following blocks in the Scripts Area of the Scratch window and save the project.**




Modify the following blocks. Run the script again and observe the difference.

- Decrease the steps in `move 150 steps` block to 100.
- Increase the degrees in `turn 15 degrees` block to 80.
- Change the pen size to 5 in `set pen size to 10` block.
- Add `stamp` block after the `set pen size to 5` block.

```
move 100 steps
turn 125 degrees
pen down
change pen color by 35
set pen size to 5
stamp
turn 80 degrees
```

## PROJECT WORK — Using Creativity

**Draw the given images in Scratch with a colourful Pen style.**