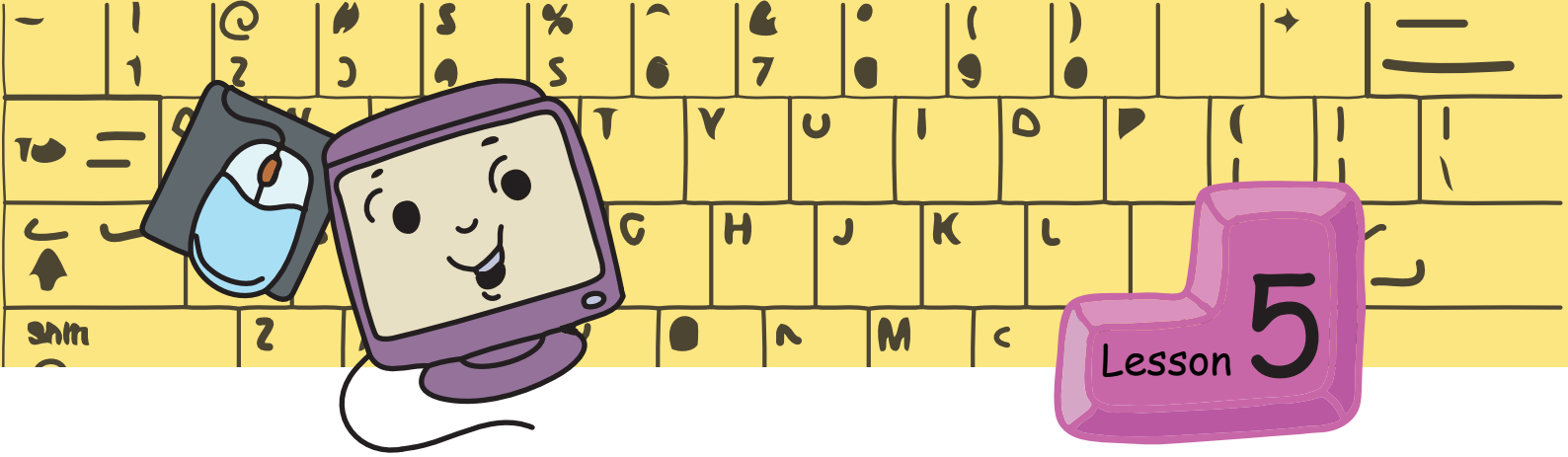
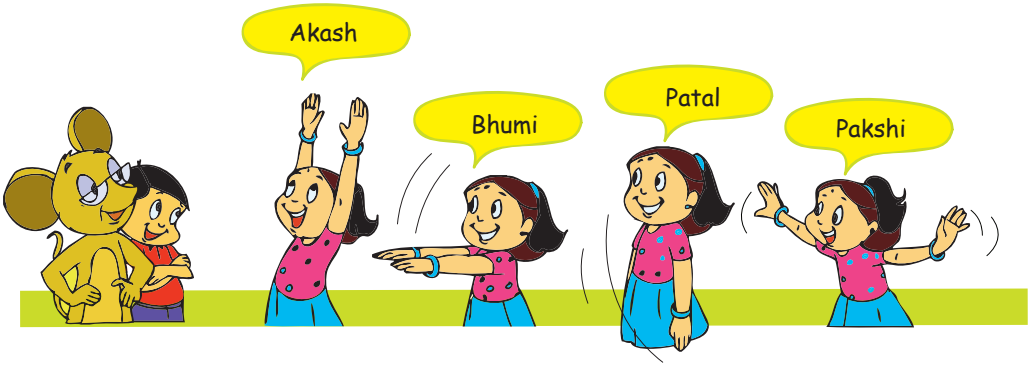


Simple Animation with Scratch

Aim

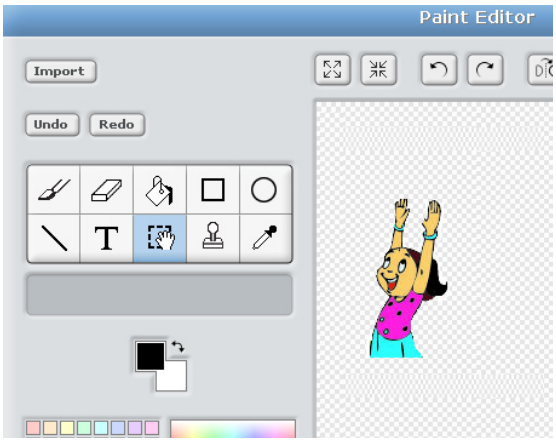
In this lesson you will learn:
To program in Scratch, using the instructions under control block.
To change the background of the stage.

Tejas and Jyoti are playing a game while Moz looks on.
The name of the game is 'Akash – Bhumi – Patal – Pakshi'.
The actions are: Akash – raise both hands up.
Bhumi – Both hands in front.
Patal – Both hands down.
Pakshi – Hands to the sides and flap.
Tejas gives a sequence: Akash – Bhumi – Pataal – Pakshi
Jyoti does the actions in the sequence.



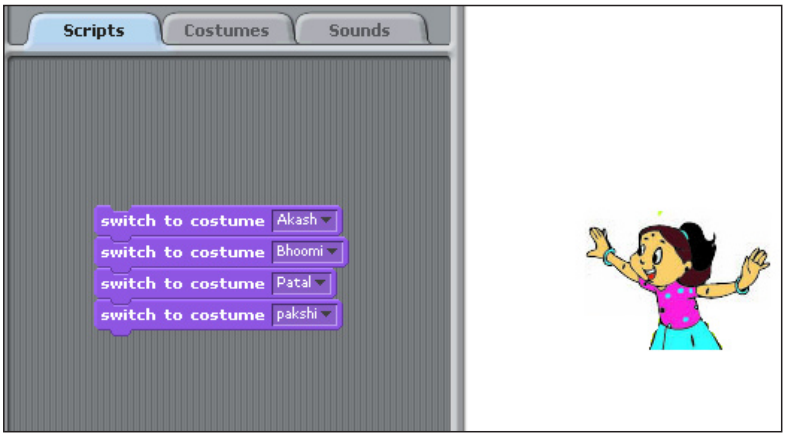
Tejas gives a sequence: Bhumi- Akash – Pakshi- Pataal
Jyoti does the actions in the sequence, but gets two of them wrong.

Tejas: Oh! you got the sequence wrong.

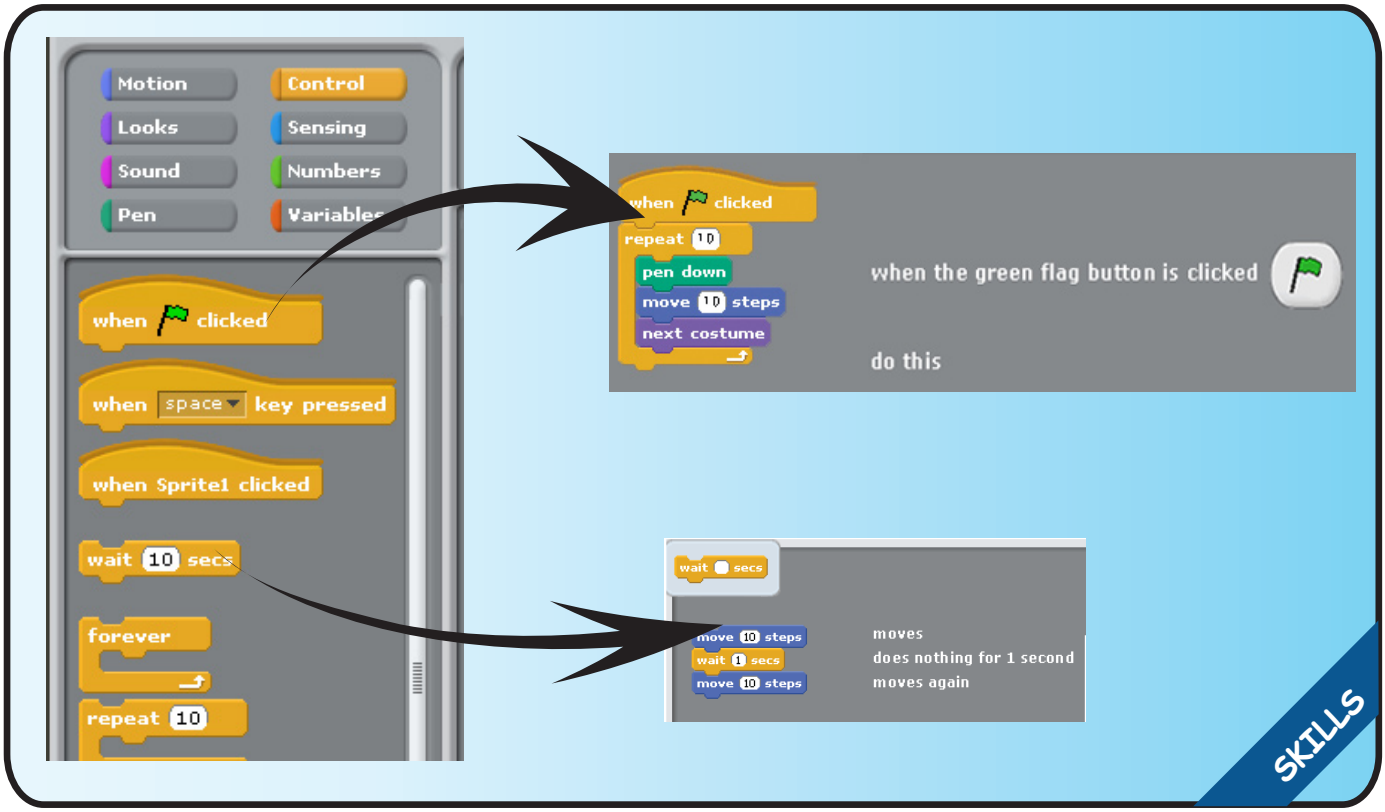


Moz: This is an interesting game. Now let us use the Paint Editor to draw the Sprite and Costumes for the game.

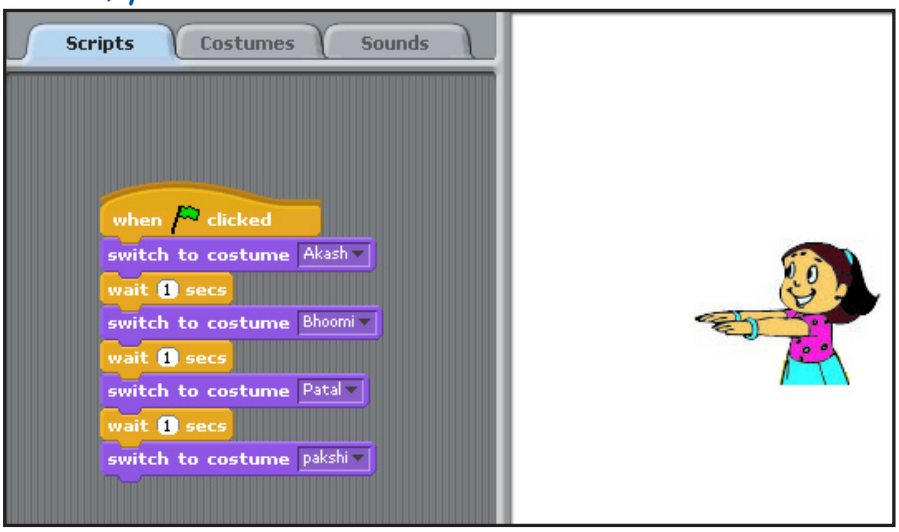
Tejas: Moz, we will write the instructions to make the Sprite
do one sequence of the game.



Jyoti: But it does the sequence so fast. What can we do?
Moz: What type of instruction do we need?
Jyoti: We need something to make the Sprite "wait".
Moz: Good. Explore the instructions in the control block. You can use the 'wait' instruction to make the Sprite do the sequence slowly.

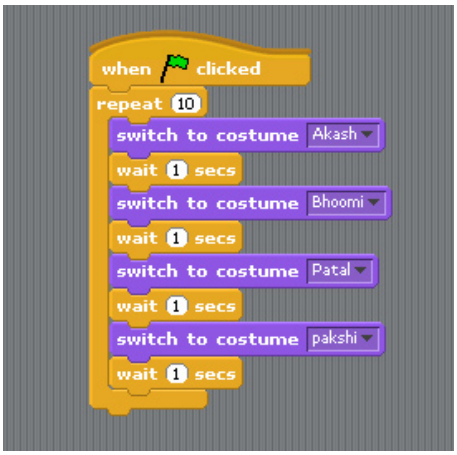


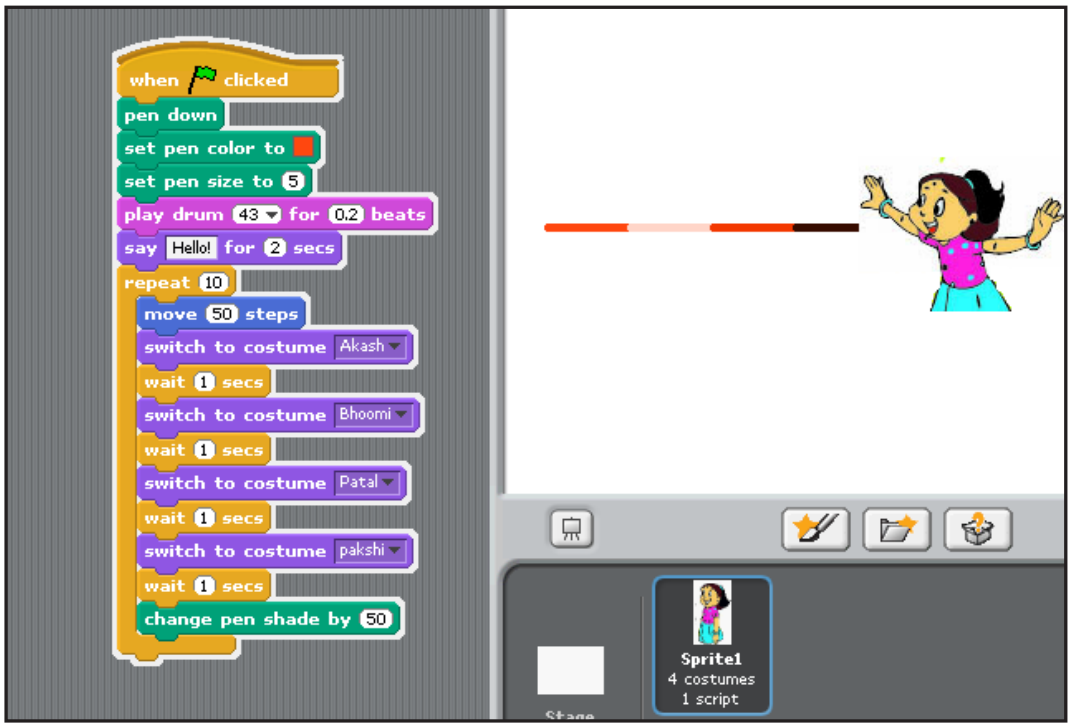
Tejas (pointing to "When green flag clicked"): Can we use this instruction to start the program?
Moz: Of course, you can.



Jyoti: Now we want the sprite to repeat the sequence 10 times.
Tejas (points to the Repeat instruction): Oh! Look at this instruction.

Tejas moves the control block **Repeat 10 times** to the script area and clicks on green flag to execute the instructions.
Tejas and Jyoti use instructions from 'motion', 'sound', 'pen', 'costume' and the 'repeat' instruction from the control block and write a program. Let us have a look at their program and its execution.

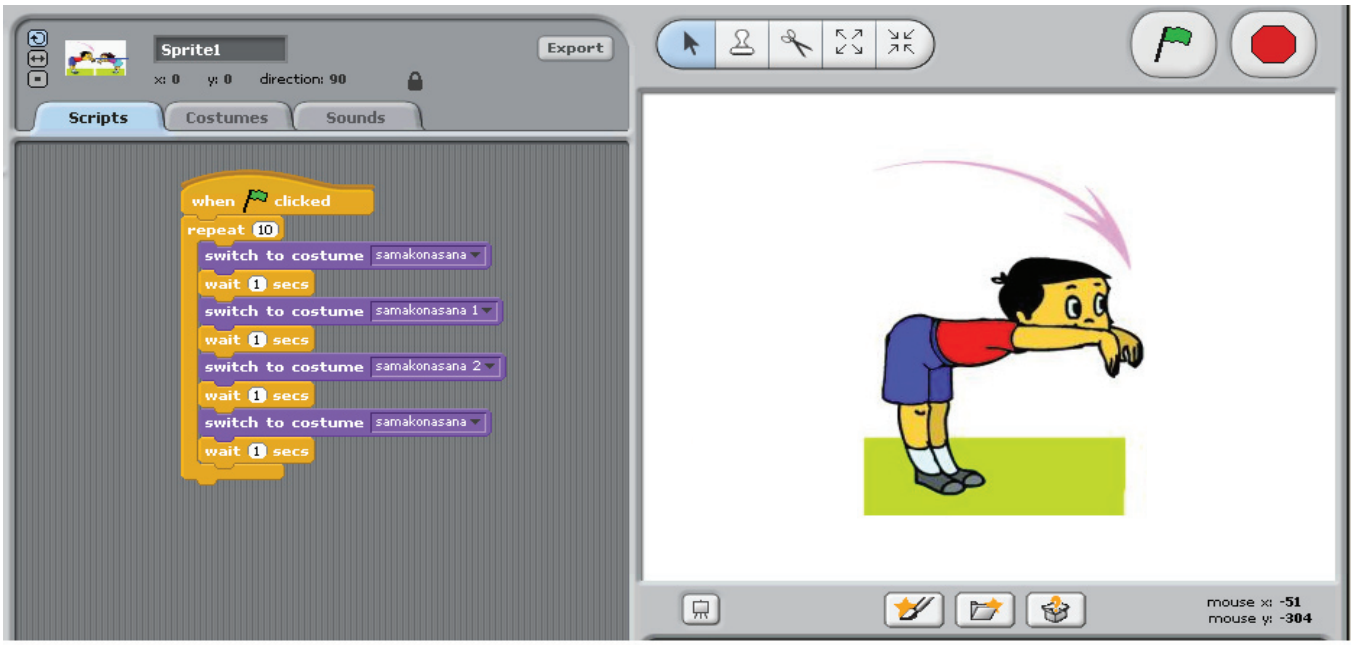




Tejas and Jyoti take a break and start exercising. Moz makes it fun by making a game out of it. When Moz says "start", they start exercising. When Moz rings a bell, they change the exercise.
When Moz says "stop", the children stop exercising.

Tejas: That was fun.
Jyoti: Let us write a program for this game.
Moz: I have created a Sprite for Samakonasana, you can use it.
Tejas: Let us try the block "When Flag clicked".
Tejas moves the block to the script area.

Moz: Ok. Now what do you want the sprite to do when the flag is clicked?
Jyoti: Start exercising.
Tejas: Let us write the instructions for the exercise.
Jyoti: We should also make the Sprite repeat the exercise.



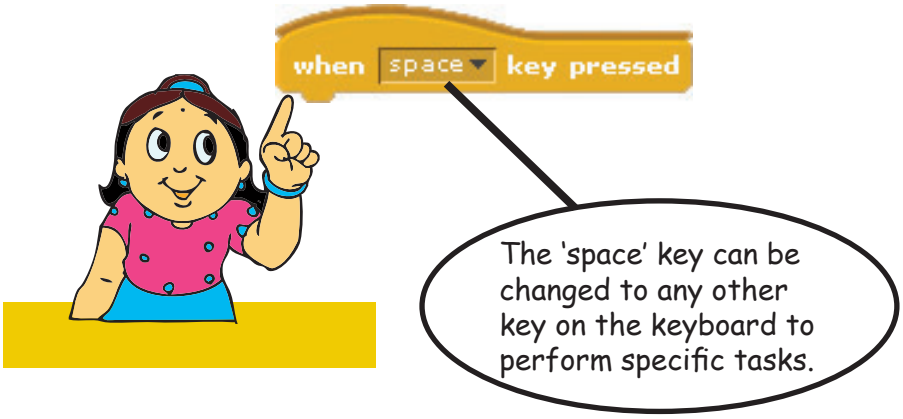
Moz: Good. Now click on the flag  and see what happens?

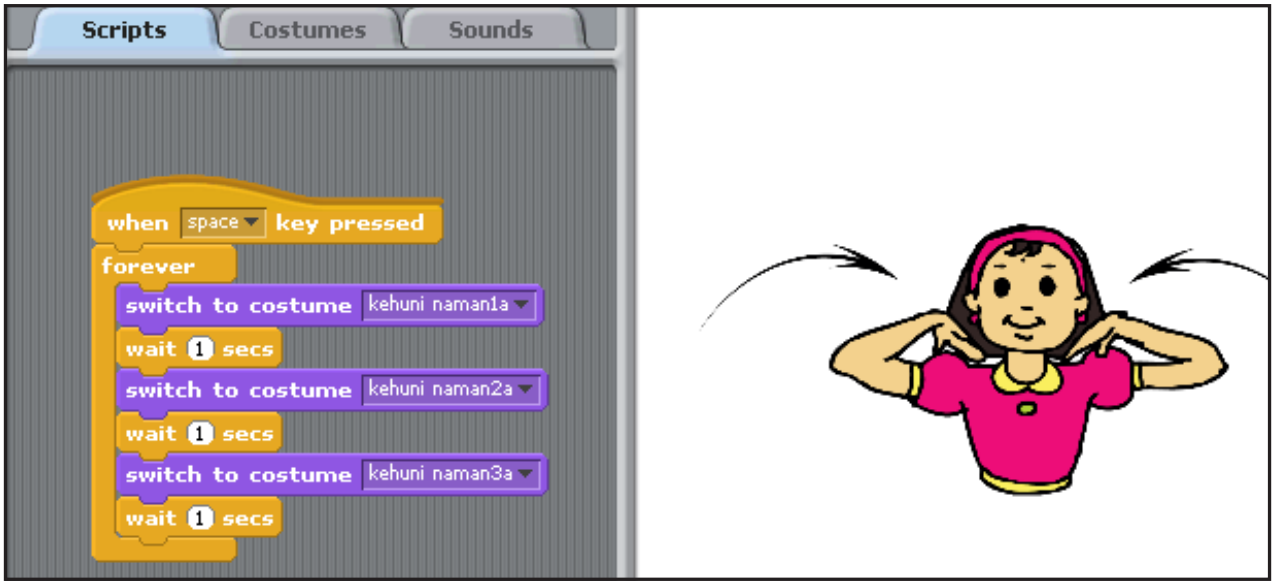
Tejas: Oh! The instructions are executed by the computer!
Moz: Yes.

Tejas: Do we always use the flag to start the program?
Moz: No. What does the instruction say?
Tejas: "When Flag clicked".
Moz (pointing to the block "when space key pressed"): You can replace the flag instruction with this instruction.

Jyoti: Can I write another block and use one of the control keys to start the execution of the block?
Moz: Yes. Go ahead and write instructions for Kehuni naman.

Jyoti changes the instruction and uses the space bar to start the program.

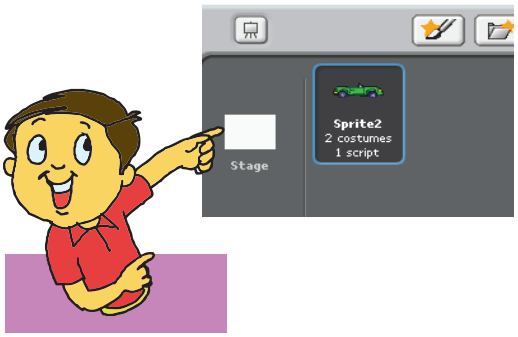




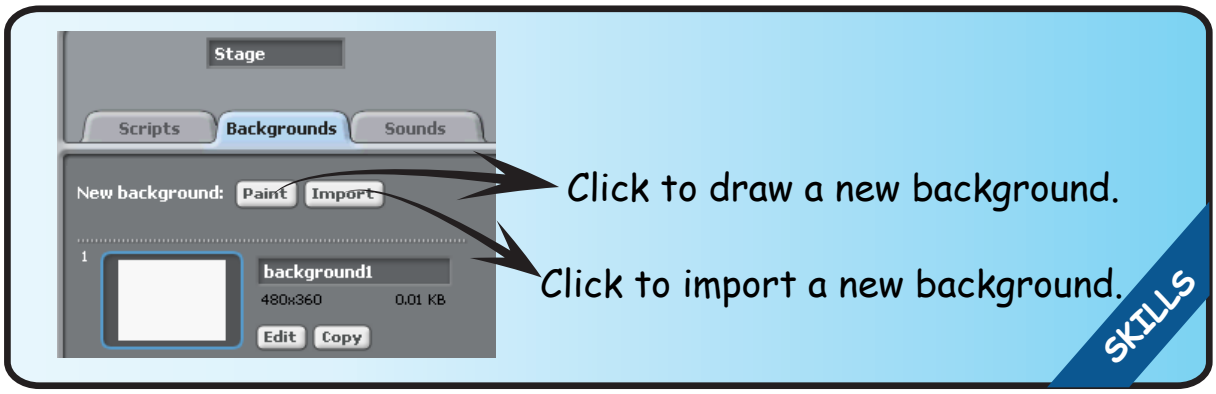
Moz: Good. Both of you have done well using the control block. When should one use the control block?
Jyoti: When we want to repeat a set of instructions.
Tejas: And when there are conditions like "wait for 10 seconds" or "When a key is pressed do something".
Moz: Correct.

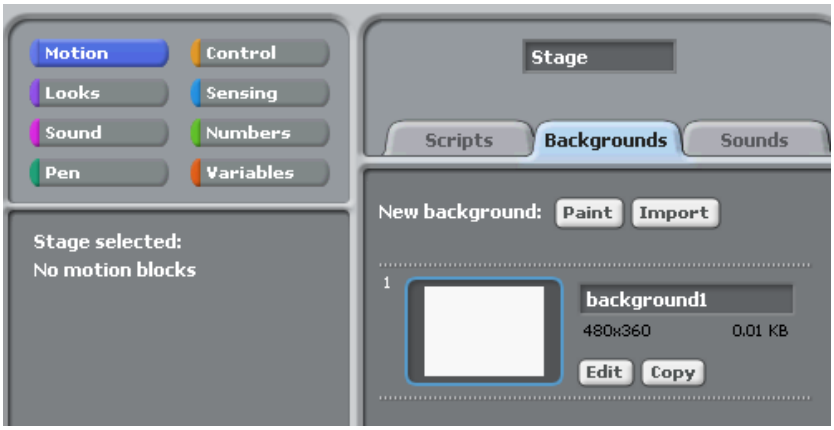
CONCEPTS

Repeat and conditional instructions help in controlling the execution of the program.



Tejas (pointing to the stage icon): What is this icon?
Moz: It is the stage icon. This icon is used to change the background of the stage. Click on the icon and see what happens?





Jyoti: There are no motion blocks!

Moz: Background of the stage cannot move, so there are no commands in the motion block. The Stage changes the Background just as a Sprite changes Costumes. Explore other available instructions for the Background.

Tejas: See the Sprite has more commands under the 'looks' and 'pen' blocks than the Background.

The Background of the Stage can be changed. This is similar to changing the Costume of a Sprite.

Info

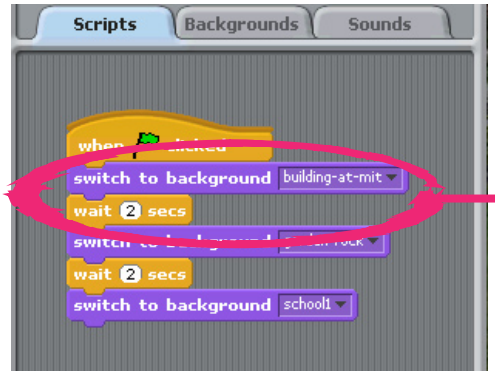
Moz: Now write a program to change the Background of the Stage.

Tejas: Let us make the Sprite go to school.
Moz: You have to write a separate Script for the Background and the Sprite.
Jyoti: Then how do we run them together?
Tejas: Suppose we use the same key to start both Scripts, will both the Scripts start running at the same time?
Moz: Yes. You are correct. Both Scripts will start running together at the same time.

Jyoti and Tejas plan the sequence for the Sprite and Background as follows:

- Start with a background of a Mall.
- Let the Sprite move and say "Oh! This is the Mall".
- Change the Background to a garden.
- Let the Sprite move and say " This is the Five Gardens".
- Change the Background to school.
- Let the Sprite move and say "Finally, I have reached school".

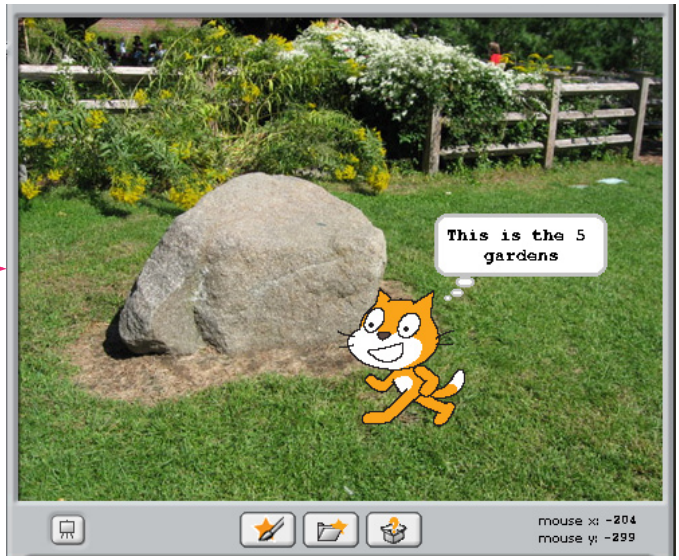
Tejas: When the Sprite moves and says something, it will take about 2 secs (seconds).
Jyoti: So let us change the background after 2 secs.
Tejas: Let us start both the Sprite program and the Background program with "When flag clicked".



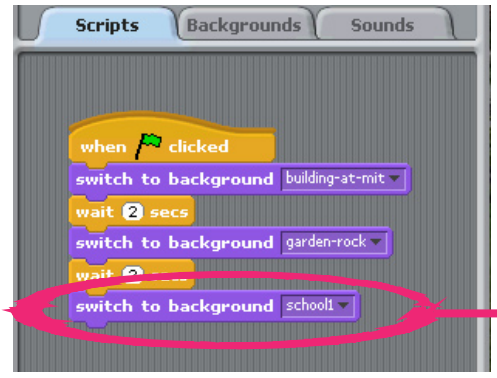
Script for the Background

Script for the Sprite

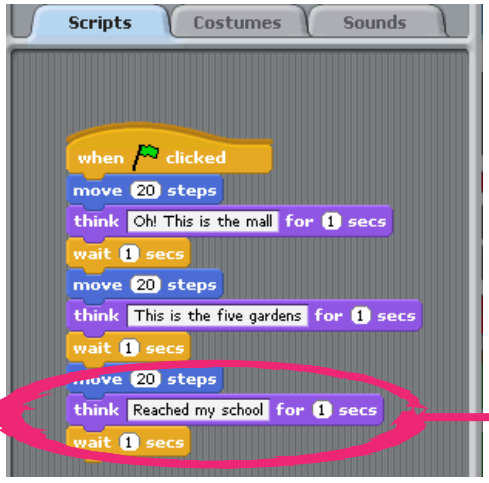
Script for the Background



Script for the Sprite



Script for the Background



Script for the Sprite

Tejas: Oh! Looks like the Sprite is walking from home to school.
Jyoti: This is fun. Even with limited instructions we can make the Sprite do quite a few activities.
Tejas: And also make it look real by changing the backgrounds.
Moz: Yes. There are many more instructions in the five blocks of Scratch that you have learnt.

SKILLS

1. Plan the activity step by step.
2. Choose or paint the Sprite and costumes that are required for the activity.
3. To build the program, use the instructions available under motion, looks, sound, pen and control blocks of scratch.
4. Run the program.

Info

Blocks of scratch and their usage

- Motion - Move the Sprite up, down, right, left, forward,or backward.
- Looks - Change the looks of a Sprite or the Background with Costumes.
- Animate the Sprite. Make the Sprite say something using Think or Say bubble.
- Sound - Play a sound or a musical note. Change the volume of the sound.
- Pen - Make the Sprite draw as it moves. Change colour, shade, thickness of the pen. Stamp Sprite's image on the stage.
- Control block - Repeat some actions. Use conditional instructions like "when key is pressed", do something. Include some time gap between actions.

Jyoti: Tejas, Let us plan a story and try it out tomorrow.
Moz: Good. Chin chinaki...

Learning Outcome

After you have studied this lesson, you will be able to:

- Plan and sequence the steps of a Scratch program.
- Use appropriate Control Blocks to write the program.
- Change Background of the Stage.

WORKSHEETS

1. Circle the correct option.

1. To make the Sprite wait for some seconds, you can use the 

. Where can you find this instruction?

   Control Block Looks Block Motion Block

2. The Background of the Stage can be changed using the instructions under the _____ block.

   Looks Motion Pen

2. Circle the instruction that starts the following program.

3. State whether the following statements are true or false.

1. There are no instructions under Motion Block when the Stage is selected. True/ False

2. To change the look of the Stage, we should change the Costumes. True/ False

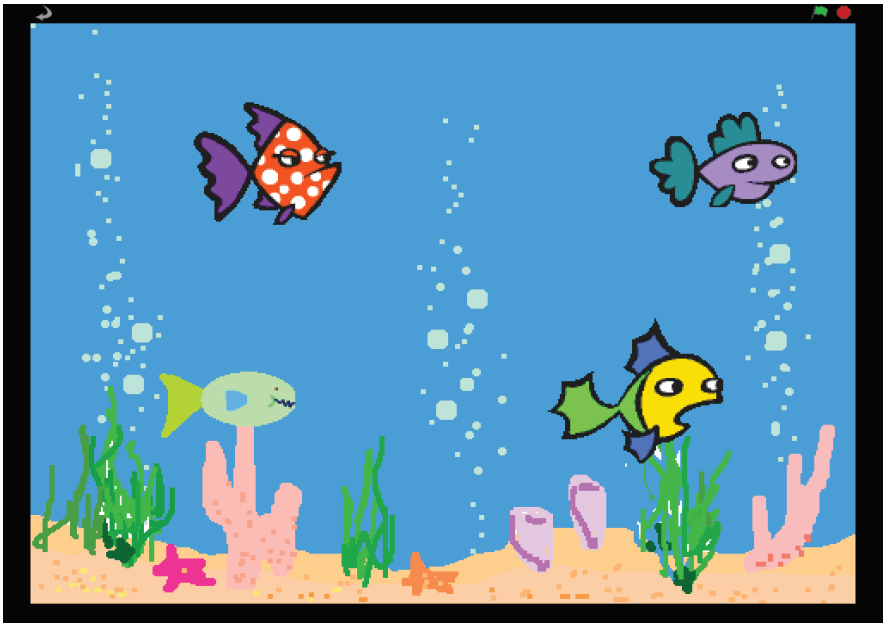
3. The 

instruction helps you to show the trail of the Sprite. True/ False

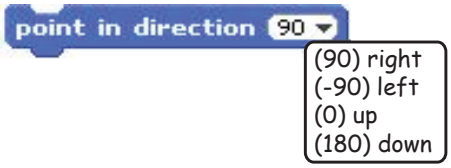
4. Match the instructions to the appropriate blocks.

Pen	
Control	
Looks	
Motion	

1. Make the following scene in Scratch.

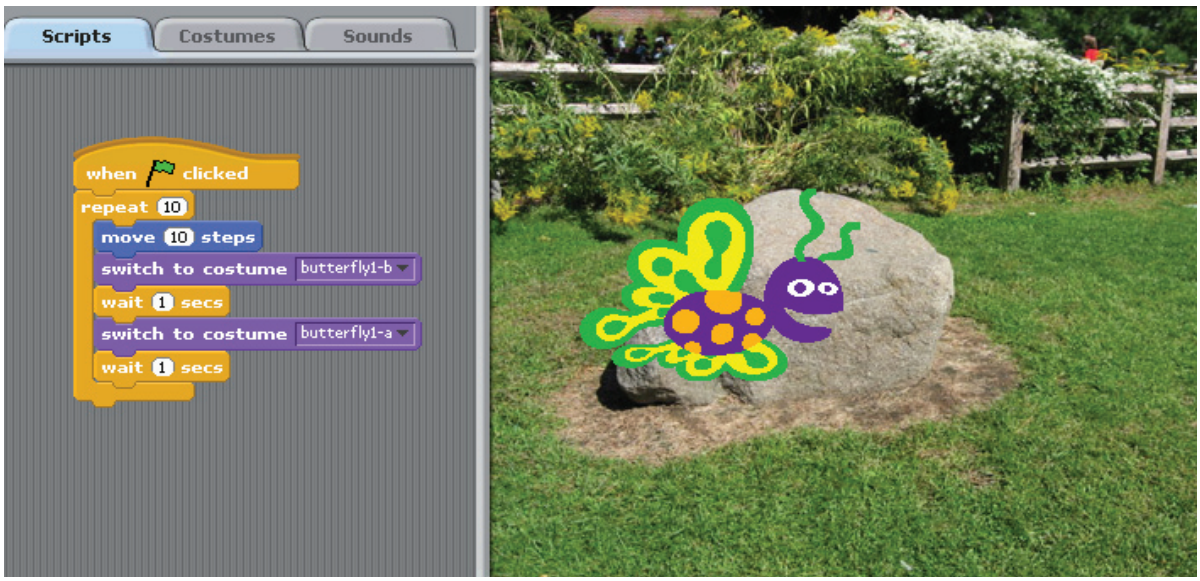


a. Write scripts to make each fish move in a different direction (up, down, left and right).

Hint: Use 

b. Write a script to make all the fish move in the same direction together?

2. Run the following program and see what happens?



3. Observe the following scene.

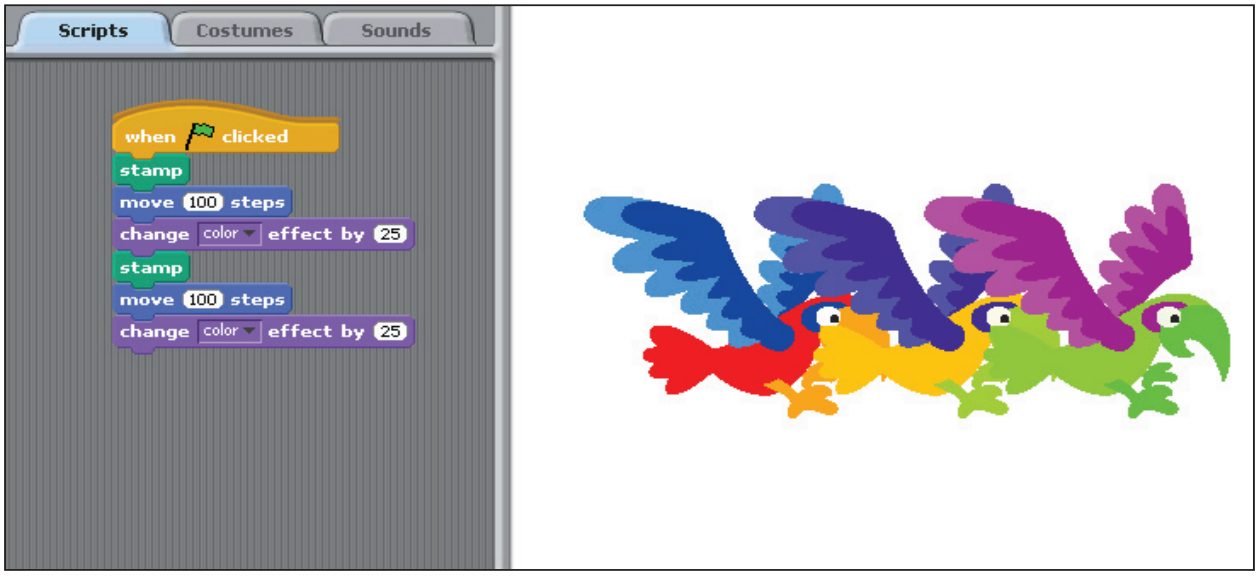
a. Write the Scripts for a dialogue between the two Sprites. You can use any Sprites of your choice.

Sprite 1: How are you?

Sprite 2: I am fine, thank you.

b. Write Script to make the Sprite dance to the beat.

4. Write the following program in Scratch and see the effects.



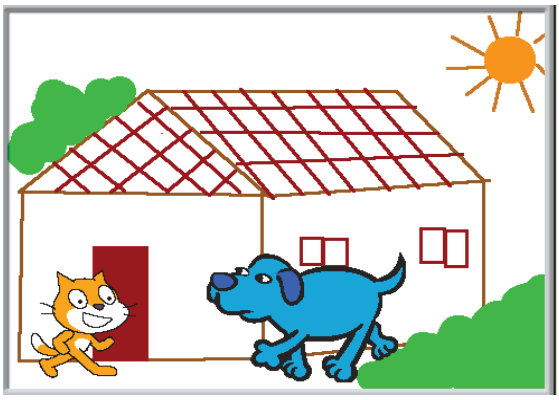
Now see if you can run the same program without repeating the commands.

Hint: Explore the instructions under control block.

Use the clear graphic effects instruction to clear all the changes you make.

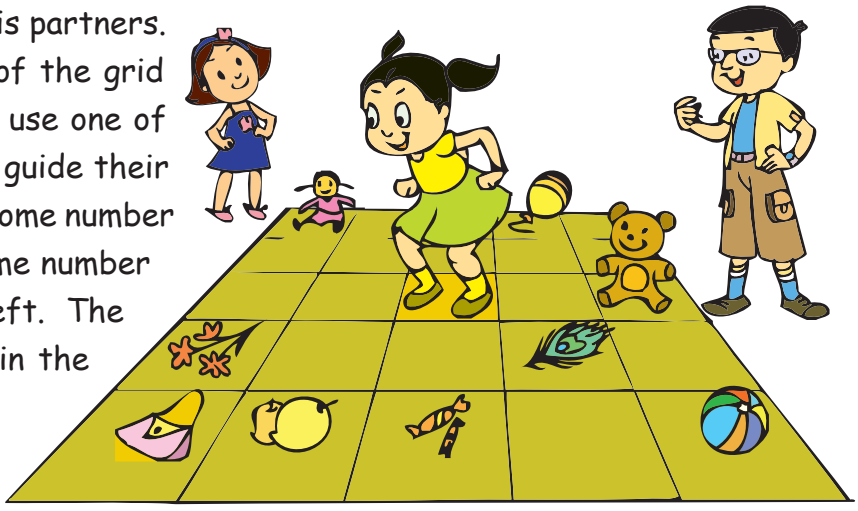
5. Using Paint editor draw two backgrounds of your choice. Now introduce Sprite(s) and create an animation. Explain the same to the class.

   Example:



Group Activity

Hopping game: To play this game the students are divided into groups of three. A grid (say 5x5) is drawn on the floor and the central square is marked. Two to three objects are taken and placed on some other squares of the grid. These could be balls or sweets or any small thing that the class finds attractive. Three students will play the game together. One student stands on the centre square, and will try to hop to the squares with the objects in them and pick them up. The student can only hop according to the instructions of his partners. The partners stand at the edge of the grid and give the directions. They can use one of the following four instructions to guide their hopping friend: Move forward by some number of squares, Move backward by some number of squares, Turn right, Turn left. The game ends after all the objects in the grid have been picked up.



Project

Do project 5 given in lesson 7.

Explore!

1. How will you make the Sprite draw concentric circles (circle within a circle with the same center)?
2. Explore where is the 'stamp' option in Scratch. Use it in a program and see what happens.

- Start the class by revising the terms like Sprite, Looks, Costumes and Motion. Now ask the question "How do we start a Program/Script?" Double click is the option taught so far.
- Now write a Script to change the Costume of the Sprite. Run the program and see how fast the code is executed. The change in costume is so fast that it will be hardly noticeable. Ask the students what instructions are required to slow it down!
- Introduce the Control block and the commands available under it. "Wait, when green flag, space or any other key pressed", are some of the commands that can be introduced now.
- Now show the Stage icon. Show how the set of commands under the different blocks like motion, control, etc. changes the output. Ask why there are no motion commands for the Stage?
- Explain what the Background is and show them how to change it. Tell them that we can draw Backgrounds using the Paint editor.
- Using all these commands and background, modify the Script which was written at the start of the class. If needed, introduce more commands under Looks, Motion and other instruction blocks to make a small skit. Let the students observe how the program runs when the 'green flag' is pressed.
- Ask the students to write projects and save it under a suitable name.

Further Reading :
http://info.scratch.mit.edu/Support/Scratch_Cards