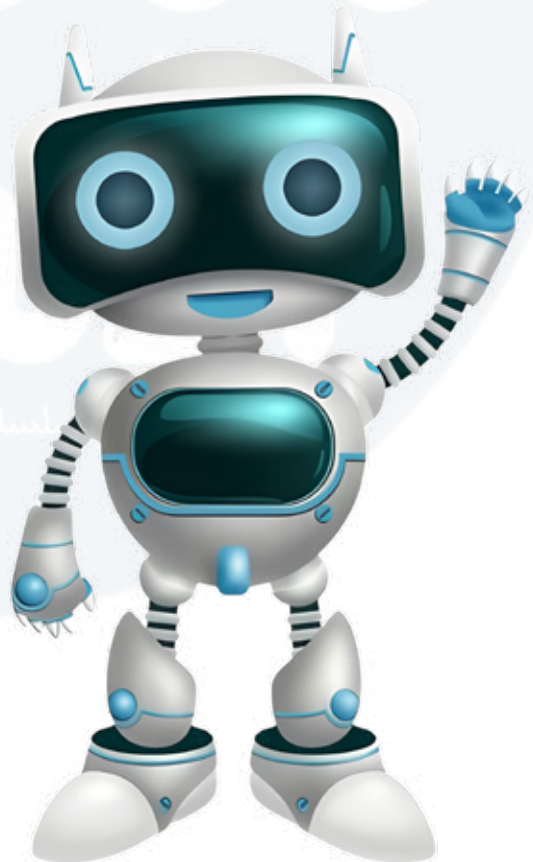


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### Lesson 4 Scratch

#### Definition:

- » **Scratch Program:** It is a visual and easy-to-use educational tool for learning programming through games, animations, music, and more.



#### Key Points:

» **Scratch Program Features:**

- 1 **Simple Interface:** It uses and orders visual blocks to form programs.
- 2 **Educational:** It is designed to teach basic programming concepts in a fun way.
- 3 **Free:** It is available for download from its official website for free.
- 4 **Creative Thinking:** It develops skills in creative thinking and problem-solving.
- 5 **Problem-solving Skills:** It solves problems in a logical way.
- 6 **Collaboration:** It enhances teamwork skills.
- 7 **Foundation:** It provides a strong start for learning more complex programming languages.
- 8 **Sharing:** Its projects can be shared with others.



» **Program Interface:**

- Menu Bar
- Command Blocks Area
- Script Area: It collects programming sections.
- Stage Area: It shows project results.
- Sprite Object
- Sprites Area: It contains the project's objects.

» **Coordinates:**

- **Determine Coordinates:** X=..... (horizontal), Y=..... (vertical)
- **Change Coordinates:** Drag and drop the sprite to a new position.

### »» Implement the project:

- To execute the project, click on the icon .
- To stop the execution of the project, click on the icon .

### »» Saving the Project:

- File Menu: Choose "Save to your computer".
- The file extension is **Sb3**.

## Lesson 5 Sprites Area in Scratch

### Definition:

- »» **Sprites Area:** It contains the sprites used in the project.

### Key Points:

### »» Sprites Area Features:

- 1 Name:** It is modified by clicking and renaming.
- 2 Location:** It determines the sprite's position (X, Y values).
- 3 Direction:** It changes the sprite's movement direction.
- 4 Visibility:** It shows or hides the sprite.
- 5 Size:** It changes the sprite's size.
- 6 Delete:** It removes the sprite.
- 7 Add:** It is used to choose a new sprite.

### »» Adding a New Sprite:

- Choose Sprite: Select Basketball.
- Remove: Delete the cat sprite.

### »» Project 2: Moving the Ball

- **Objective:** To move the ball randomly, make a sound, repeat 10 times.

### »» Steps:

- 1 Motion:** Choose "Go to random position".
- 2 Sound:** Choose "Play sound".
- 3 Control:** Choose the "Repeat" command.

④ **Events:** Choose the “When Clicked” command.

### »» Project 3: Spaceship

– **Objective:** To move a spaceship randomly, make a sound, change size, repeat 5 times, start from (0, 0).

– **Steps:**

① **Insert Sprite:** Add Rocketship.

② **Remove:** Delete the cat sprite.

③ **Background:** Choose “Space”.

### »» Square Drawing Project:

① **Open Project:** Start a new project.

② **Select Pen:** Drag the “pen” block to start drawing.

③ **Set Color and Size:** Use “Set Pen Color to” and “Set Pen Size to” blocks.

④ **Move the Pen:** Use “Go to x:y:” blocks to draw lines.

⑤ **Repeat the Steps:** Draw more lines to form shapes.

### »» Drawing a circle:

»» Use the “Repeat” block to repeat the process of drawing short lines at different angles.

### »» Notes:

① **Drawing Shapes:** Set start and end points for lines.

② **Adding Details:** Add features like eyes, mouth, and ears.

## Lesson 6 Principles of Python

### Definition:

»» **Python:** It is a programming language widely used in data science, machine learning, and web development.





## Key Points:

### »» Features of Python:

- 1 **Open Source:** It is free and open for everyone to use and develop.
- 2 **Interpreted Language:** It translates codes line by line, making error detection easier.
- 3 **Versatility:** It is used in web development, data science, AI, machine learning, and game programming.
- 4 **Easy-to-Use:** It is simple and organized, with syntax similar to English.
- 5 **Integration:** It can be integrated with languages like C, C++, and Java.
- 6 **Libraries:** Numerous libraries are available for various tasks.

### »» Python Libraries:

- »» **NumPy:** It is used in data science, statistics, and AI.
- »» **Pandas:** It is used for data analysis and processing.
- »» **Matplotlib:** It is used for creating graphs and charts.

### »» How to Download Python:

- 1 **Visit:** Go to the official Python website [www.python.org](http://www.python.org).
- 2 **Choose Download:** Select the download option.
- 3 **Select System:** Choose your operating system (Windows, Mac, or Linux).
- 4 **Choose Bit Version:** Select 64-bit or 32-bit based on your device specifications.
- 5 **Install:** Download and install the program, following the instructions.



## Lesson 7 Variables in Python

### Definition:

- »» **Variables:** They are reserved places in memory to store values that can change during program execution.

## Key Points:

### »» Conditions for Naming Variables in Python:

- 1 Start with a letter or underscore (`_`).
- 2 Contain letters (A-Z), numbers, or underscore (`_`).
- 3 Avoid reserved words.

### »» Types of Variables in Python:

- 1 **Numbers:** To store numerical values.
  - **Integer Variables (int):** `X = 5, Y = 10`
  - **Decimal Variables (float):** `Z = 5.25, A = 8.32`
- 2 **Strings:** To store texts, enclosed in single or double quotes.
  - **Examples:** `Name = "Taher", City = 'Cairo'`
- 3 **Booleans:** They contain only two values, True or False.
  - **Examples:** `Is_taher_student = False, Is_taher_a_teacher = True`

### »» Python Program Interface:

- 1 **Interactive Python Interface (Python Shell):** It is used to write and execute simple codes directly.
  - It is automatically installed when you install the language.
- 2 **Text Editor:** It is used to write longer, complex codes and save them for later execution.



### »» Using the type ( ) Function:

- **Purpose:** To determine the type of a variable.

### »» Simple Python Code Using Variables:

- **Print Function:** It displays text, variables, or results of mathematical operations on the output screen.

### Model Exam

### 1

#### 1 Choose the correct answer:

- The Sprites Area in Scratch contains .....  
a. backgrounds    b. sprites    c. sounds    d. blocks
- The X and Y values in Scratch represent the .....  
a. size of the sprite    b. direction of the sprite  
c. location of the sprite    d. color of the sprite
- Scratch allows students to learn ..... principles.  
a. drawing    b. music    c. programming    d. all of them
- Scratch can be used to create .....  
a. games    b. animations    c. simulations    d. all of them
- The text value of the variable is placed between the signs .....  
a. " "    b. < >    c. > =    d. = <
- To display texts, variables, or even the results of mathematical operations, we use the function .....  
a. Cos( )    b. Type( )    c. Print( )    d. Sin( )
- In Scratch, to add sound effects to the sprite, we use the command .....  
a. Repeat    b. Looks  
c. Play Sound    d. Choose a Backdrop
- The file extension for a Scratch project is .....  
a. Docx    b. Sb3    c. Bmp    d. Jpg

#### 2 Put (✓) or (X):

- In the Scratch program, we use the coordinates (x, Y) to determine the location of a sprite on the stage. ( )

- 2 Python is one of the most difficult programming languages. ( )
- 3 In Scratch, the name of the sprite can be changed multiple times. ( )
- 4 Python is used in developing web applications, data science, artificial intelligence, machine learning, and game programming. ( )
- 5 The Scratch program is paid. ( )
- 6 Python can be integrated with other languages, such as C, C ++, and Java. ( )
- 7 The texts of variables in Python are placed between single quotation marks ' ' or double quotation marks " ". ( )

## Model Exam

### 2

#### 1 Choose the correct answer: سلسلة كتب

- 1 To add a new sprite, click on ..... .
  - a. Choose Sprite
  - b. Delete Sprite
  - c. Rename Sprite
  - d. Move Sprite
- 2 The "Go to random position" command is found in the ..... group.
  - a. Motion
  - b. Sound
  - c. Control
  - d. Events
- 3 The "Pen" extension is added by clicking on ..... .
  - a. Choose Sprite
  - b. Add Extension
  - c. Delete Sprite
  - d. Change Backdrop
- 4 Scratch is a fun and ..... educational tool.
  - a. difficult-to-use
  - b. easy-to-use
  - c. text-based
  - d. none of them
- 5 Scratch helps enhance ..... skills.
  - a. problem-solving
  - b. collaboration
  - c. creative thinking
  - d. all of them
- 6 To know the type of variable statement in Python, we use the function ..... .
  - a. Cos ( )
  - b. Type ( )
  - c. Print ( )
  - d. Sin ( )



- 7 The Scratch program interface areas are like ..... .  
a. command blocks   b. stages   c. both a & b   d. none of them
- 8 To modify (rename) the sprite name, click on ..... .  
a. Sprite and rename it   b. Sprite and delete it  
c. Sprite and add it   d. Sprite and change its color

## 2 Put (✓) or (X):

- 1 `Is_taher_student = False`: The statement type of the variable `Is_taher_student` is logical (Boolean). ( )
- 2 To know the type of the variable, we do not need to use the `type()` function. ( )
- 3 In Scratch, the horizontal and vertical axes are used to determine the current position of the sprite on the stage. ( )
- 4 In the Scratch program, students face difficulty in sharing projects with others. ( )
- 5 The direction of the object's movement in Scratch can be changed by pressing the word Direction. ( )
- 6 To modify the object's name in Scratch, press its current name and rename it. ( )
- 7 Only one object can be added to the stage in Scratch. ( )

## Model Exam

### 3

## 1 Choose the correct answer:

- 1 To make the ball move randomly, use the ..... command.  
a. Go to random position   b. Move 10 steps  
c. Turn 15 degrees   d. none of them
- 2 To draw a geometric shape, you need to set the ..... points of the lines.  
a. random   b. middle   c. start and end   d. none of them

- 3 The "Repeat" command is used to ..... .
  - a. delete a sprite
  - b. execute actions multiple times
  - c. change the backdrop
  - d. play a sound
- 4 To execute the project, click on the ..... icon.
  - a. green flag
  - b. red stop sign
  - c. blue arrow
  - d. none of them
- 5 To save your Scratch project, select the File menu, then select ..... .
  - a. Save to your computer
  - b. Sprites
  - c. Creative thinking
  - d. Learn principles of programming
- 6 If the movement is too fast, the command ..... from Control Blocks is used.
  - a. Wait
  - b. Repeat
  - c. Forever
  - d. Else
- 7 The function ..... is used to display texts or values on the output screen.
  - a. Cos( )
  - b. Type( )
  - c. Print( )
  - d. Sin( )
- 8 A new background for the project is inserted by pressing ..... .
  - a. Script Area
  - b. Stage
  - c. Choose Sprite
  - d. Choose a Backdrop

## 2 Put (✓) or (X):

- 1 When naming variables, reserved words in the Python language may be used. ( )
- 2  $Y = 10$ : The statement type of the variable Y is numeric for an integer. ( )
- 3 `City = "Cairo"`: The statement type of the variable City is text. ( )
- 4 Scratch is used in teaching advanced programming. ( )
- 5 In Scratch, a code segment is a combination of commands arranged in a specific order. ( )
- 6 A Scratch project can be saved from the File menu by selecting 'Save to your computer.' ( )
- 7 The sprites used in the project appear in the Sprites Area. ( )

# Model Exam

## 4

### 1 Choose the correct answer:

- 1 To stop the execution of the project, click on the ..... icon.
  - a. green flag
  - b. red stop
  - c. paintbrush
  - d. Scratch logo
- 2 To execute the project's steps, use the command ..... .
  - a. Change x by 10
  - b. Move 10 steps
  - c. Wait 1 seconds
  - d. When green flag clicked
- 3 To move the pen to a specific point, use the ..... block.
  - a. Go to x: y:
  - b. Move 10 steps
  - c. Turn 15 degrees
  - d. none of them
- 4 Scratch areas are blocks, script, stage, and ..... .
  - a. save to your computer
  - b. sprites
  - c. creative thinking
  - d. learn principles of programming
- 5 Scratch program helps students to learn principles of programming and ..... .
  - a. save to your computer
  - b. sprites
  - c. creative thinking
  - d. simple interface
- 6 To save a project, choose "Save to your computer" from the ..... menu.
  - a. File
  - b. Edit
  - c. View
  - d. Help
- 7 Decimal variables in Python are stored as ..... data types.
  - a. string
  - b. int
  - c. float
  - d. Boolean
- 8 The "When Clicked" command is found in the ..... group.
  - a. Sound
  - b. Motion
  - c. Control
  - d. Events

### 2 Put (✓) or (X):

- 1 The sprite cannot be deleted from the stage in Scratch. ( )

- 2 Scratch helps the students to learn the basics of programming in an interesting and exciting way. ( )
- 3 To display Hello on the stage, select the command Say Hello from the control Blocks. ( )
- 4 Scratch program can be download from its official website. ( )
- 5 TAHER, Taher, taheR, TaheR are 4 names for variables in the Python language. ( )
- 6 The variable name contains letters (A-Z), numbers, or an underscore sign \_ . ( )
- 7 Python is an interpreted language because it translates programming codes line by line. ( )

## Model Exam

### 5

#### 1 Choose the correct answer:

- 1 The "Pen" extension is used to ..... .
  - a. move sprites
  - b. draw shapes and lines
  - c. play sounds
  - d. change the background
- 2 The "Set Pen Color to" block is used to ..... .
  - a. change the pen size
  - b. change the pen color
  - c. move the pen
  - d. delete the pen
- 3 When you make a Scratch project, to move the sprite, use the ..... command group.
  - a. Looks
  - b. Motion
  - c. Events
  - d. Control
- 4 To make the sprite move 30 steps, change the value in the "Move" block to ..... .
  - a. 10
  - b. 30
  - c. 60
  - d. 100
- 5 To make the ball move randomly, use the ..... command.
  - a. Go to random position
  - b. Move 10 steps
  - c. Turn 15 degrees
  - d. none of them



- 6 In Scratch, to repeat the sprite's movement, we use the .....
  - a. Start
  - b. Choose Sprite
  - c. Command Blocks Area
  - d. Stop
- 7 To add a new sprite, click .....
  - a. Choose Sprite
  - b. Stage
  - c. Motion
  - d. When Clicked
- 8 Scratch allows students to .....
  - a. learn advanced programming languages
  - b. learn the basics of programming
  - c. design web pages
  - d. write reports

**2 Put (✓) or (X):**

- 1 In the Wait command, the wait value of 1 represents 1 second. ( )
- 2 We use click and drag-and-drop to interact with any command inside the code segment. ( )
- 3 It is not permissible to create applications and websites in Python.( )
- 4 Python is used in developing data science and machine learning.( )
- 5 The variable name must not begin with a letter or an underscore sign \_ . ( )
- 6 The Scratch program offers a wide range of ideas that can be programmed. ( )
- 7 In the Scratch program, the result of the work or project appears in the Blocks area. ( )

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# Answers

## Model Exam 1

- 1 1 b 2 c 3 c 4 d  
5 a 6 c 7 c 8 b
- 
- 2 1 ✓ 2 ✗ 3 ✓ 4 ✓  
5 ✗ 6 ✓ 7 ✓

## Model Exam 2

- 1 1 a 2 a 3 b 4 b  
5 d 6 b 7 c 8 a
- 
- 2 1 ✓ 2 ✗ 3 ✓ 4 ✗  
5 ✓ 6 ✓ 7 ✗

## Model Exam 3

- 1 1 a 2 c 3 b 4 a  
5 a 6 a 7 c 8 d
- 
- 2 1 ✗ 2 ✓ 3 ✓ 4 ✗  
5 ✓ 6 ✓ 7 ✓

## Model Exam 4

- 1 1 b 2 d 3 a 4 b  
5 c 6 a 7 c 8 d
- 
- 2 1 ✗ 2 ✓ 3 ✗ 4 ✓  
5 ✓ 6 ✓ 7 ✓

## Model Exam 5

- 1 1 b 2 b 3 b 4 b  
5 a 6 c 7 a 8 b
- 
- 2 1 ✓ 2 ✓ 3 ✗ 4 ✓  
5 ✗ 6 ✓ 7 ✗