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Week 1 : Assignment 1

Assignment not submitted **Due date: 2025-08-06, 23:59 IST.**

Questions 1-7:

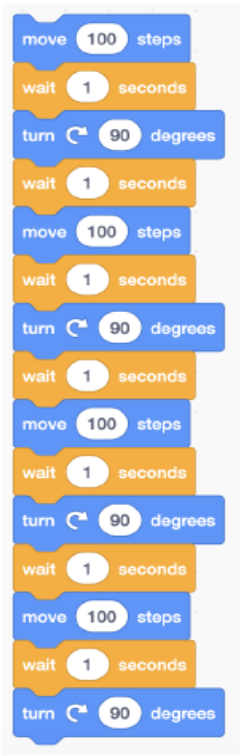
Pixel the Cat's Mysterious Journey

In the vibrant digital world of Scratchville, lives a clever little cat named Pixel who loves exploring new areas through coding adventures. One day, Pixel stumbles upon a glowing scroll in the Scratch Coding Club's lab. The scroll contains a strange pattern — a set of step-by-step movement instructions. Curious and excited, Pixel decides to follow them precisely.

Each instruction tells her to move a certain number of steps, wait patiently, and then rotate before continuing. The sequence seems repetitive, but Pixel senses that there's a hidden purpose — maybe a message, a path, or a challenge.

As Pixel begins her journey, students at the club gather around the screen, watching the curious pattern unfold. Where will she end up? What shape will her path take? Why these specific turns and pauses?

Now, it's up to you to analyze Pixel's code-driven adventure and figure out the mysteries it holds...



1) After following the sequence of movements from the glowing scroll, Pixel ends up back at the exact spot where she started. ***1 point***

- (●) True
- ( ) False

2) As Pixel follows the instructions from the mysterious scroll, she traces out a specific shape on the ground. What shape does her path form? ***1 point***

- (●) A square
- ( ) A rectangle
- ( ) A circle
- ( ) A Triangle

3) Based on the shape Pixel traces while following the scroll's instructions, what is the area covered by her path? (in square units) ***1 point***

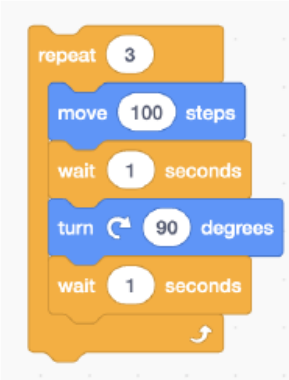
10000

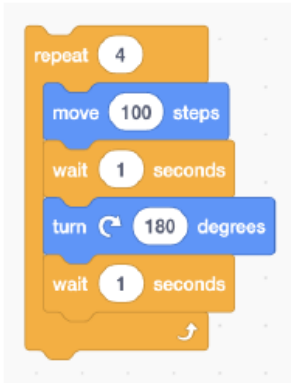
4) Suppose Pixel had turned 120 degrees instead of 90 degrees at each turn while following the scroll's instructions. What shape would her new path form? ***1 point***

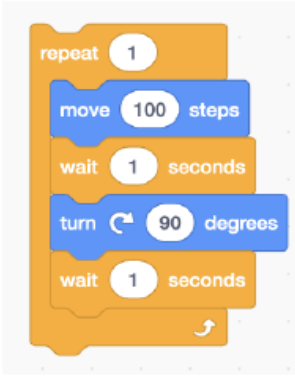
- ( ) Rectangle

- An open figure
- Hexagon
- A regular polygon

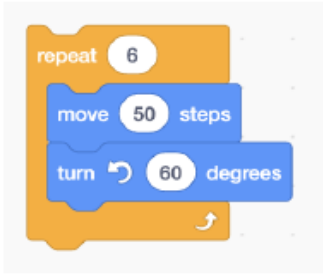
5) Several students at the Scratch Coding Club try to recreate Pixel's journey using different blocks. Which of the following Scratch code snippets would produce the same path that Pixel traced in her original adventure? ***1 point***







6) If Pixel follows a new set of instructions written in the Scratch code below, will she return to the same spot where she started? ***1 point***



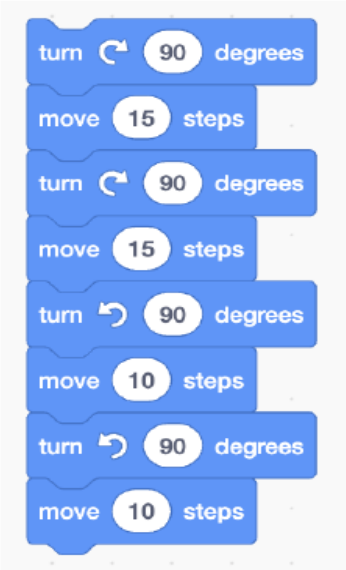
- No
- Yes

7) In the new scenario from the previous question, what shape would Pixel trace as she follows the updated instructions? ***1 point***

- A Rectangle
- A Hexagon
- A Octagon
- An open figure

Questions 8-12

A man decides to jog and follow the directions given in the scratch code. Initial Position ($x = 0, y = 0$, Direction = 90)



8) What is the total distance travelled by the man? ***1 point***

- ○ 40 units
- ○ 45 units
- ◉ 50 units
- ○ 55 units

9) What is the displacement of the man from the starting to the final position? ***1 point***

- ○ 20 units
- ○ 15 units
- ○ 24.5 units
- ◉ 25.5 units

10) In which direction is the man from the initial position at the end? ***1 point***

- ○ South-East
- ◉ South-West
- ○ North-West
- ○ East

11) What is the position of the man after the second “move”? ***1 point***

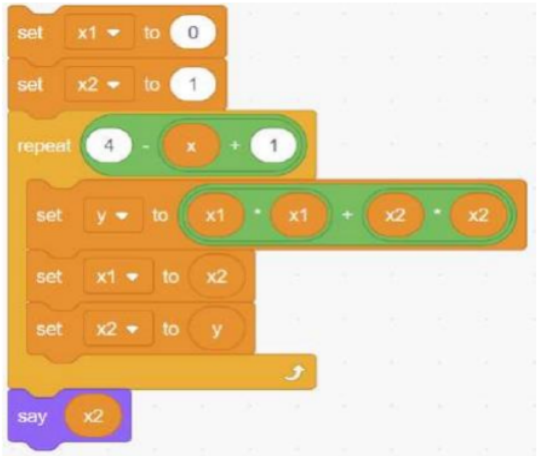
- ○ (15, –15)
- ○ (0, –15)
- ○ (–10, –25)
- ◉ (−15,−15)

12) How many turns did the man make, and how many of them were to the left? ***1 point***

- ○ 3 turns, 3 left
- ◉ 4 turns, 2 left
- ○ 3 turns, 2 left
- ○ 2 turns, 1 left

Questions 13-22

A coder wants to explore how variables, loops, and simple Arithmetic operators work in Scratch. They decide to invent a number sequence where each new term is the sum of the squares of the two previous terms. To test the idea, they start the sequence with 0 and 1, then let a Scratch script update the two variables five times (because the loop is set to run ((4 − *x*) + 1) times and the default value of *x* in Scratch is 0). After the loop ends, the sprite(you know what a sprite is if you have used Scratch :)) “says” the last value it has calculated.



13) What are the first two values placed in the sequence variables? ***1 point***

- ○ $x1 = 1, x2 = 0$
- ◉ $x1 = 0, x2 = 1$
- ○ $x1 = 1, x2 = 1$
- ○ $x1 = 0, x2 = 0$

14) How many times does the repeat loop run? ***1 point***

- ○ 3
- ○ 4
- ◉ 5
- ○ It depends on user input

15) Which operation is performed to obtain y inside the loop? ***1 point***

- ○ $x1 + x^2$
- ◉ $x1^2 + x2^2$
- ○ $(x1 + x2)^2$
- ○ $x1 \times x2$

16) What is the value of x2 after the first pass through the loop? ***1 point***

- ○ 0
- ◉ 1
- ○ 2
- ○ None (it isn't set yet)

17) Why is the assignment set $x1$ to $x2$ necessary? ***1 point***

- ○ It resets the loop counter
- ◉ It keeps the two-term window sliding forward
- ○ Without it, the program would crash
- ○ It shortens the repeat count

18) After the loop finishes, which variable's value is spoken by the sprite? ***1 point***

- ○ $x1$
- ◉ $x2$
- ○ y
- ○ x

19) What kind of control structure is demonstrated by the Repeat block? ***1 point***

- ○ Recursion
- ○ Selection
- ◉ Iteration
- ○ Parallelism

20) Which line makes the algorithm state-changing, rather than read-only? ***1 point***

- ○ set y to . . .
- ○ The repeat header
- ◉ set $x1$ to $x2$
- ○ say $x2$

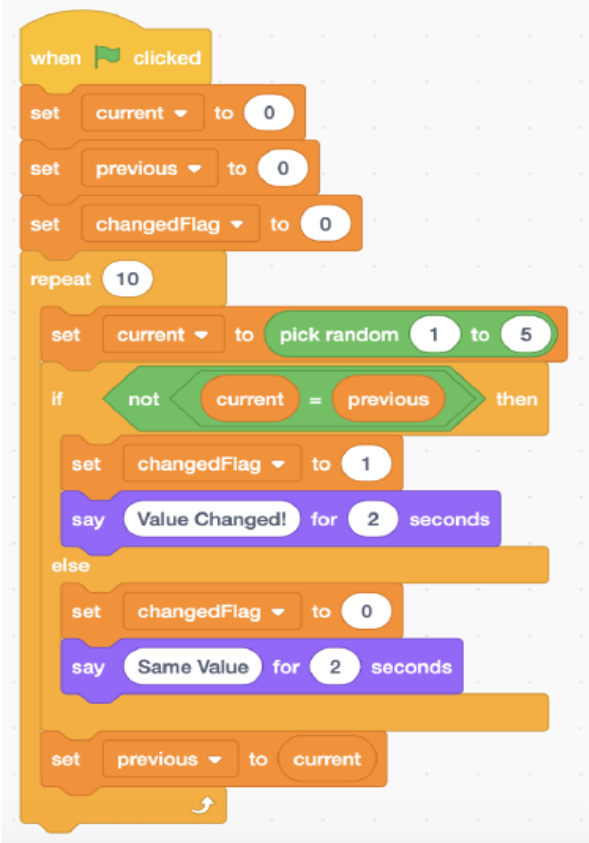
21) Suppose the loop were changed to run 1 time instead of 5. What number would the sprite say? ***1 point***

- ○ 0
- ◉ 1
- ○ 2
- ○ It would not speak at all.

22) What broad programming concept does this script best illustrate? ***1 point***

- ○ Sorting algorithms
- ○ State machines
- ◉ Numerical iteration
- ○ Event broadcasting

Questions 23-30



In many programs, it's important to remember previous values and also to check for special conditions. Two useful tools for this are:

(I) Copy variables: These are used to store a duplicate of a value before it changes, so you ca compare or recover it later.

(II) Flag variables: These are Boolean indicators (true/false or 1/0) used to control logic flow. For example, a flag might signal when a specific event has occurred.

23) What is the initial value of current and previous when the program starts? ***1 point***

- ○ Both 1
- ○ current = 1, previous = 0
- ◉ Both 0
- ○ They are uninitialized

24) What does the changedFlag variable represent in the code? ***1 point***

- ◉ Whether the value changed
- ○ The current value
- ○ The difference between numbers
- ○ Total changes counted

25) What is the role of the previous variable? ***1 point***

- ○ It counts how many times the loop ran
- ◉ It stores the value from the last iteration
- ○ It acts like a flag
- ○ It adds to the score

26) What kind of variable is changedFlag? ***1 point***

- ○ Loop variable
- ○ Copy variable
- ○ Arithmetic variable
- ◉ Flag variable

27) What is the purpose of setting previous to current at the end of the loop? ***1 point***

- ○ To reset the loop
- ◉ To compare the new value with the last one in the next iteration
- ○ To pick a new random number
- ○ To display the current value

28) How many times does the repeat loop run? ***1 point***

- ○ Until flag = 1
- ○ 5
- ◉ 10
- ○ It depends on the random value.

29) Which block is used to simulate a changing value? ***1 point***

- ○ set current to 0
- ◉ set current to pick random 1 to 5
- ○ set previous to current
- ○ say “Value changed!”

30) When does the sprite say “Same value”? ***1 point***

- ○ If current is greater than previous.
- ○ If current is not equal to previous.
- ◉ If current equals previous.
- ○ If flag is set to 1.

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers