



BRAINIACS OLYMPIAD

GRADES 3-4

CODING SAMPLE CHALLENGES



ORGANIZED BY ©BRAINIACS OLYMPIAD COMMITTEE



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CODING SAMPLE PAPER-GLOBAL FINAL

Grade: 3-4

Time: 120 minutes

Total points: 100

Equipment: Laptop

Easy challenges

Task 1

Goal: Create a program in Scratch where the traffic light sprite works continuously.

Requirements:

Draw a traffic light sprite (with red, yellow, and green lights).

Create an animation of color changes: red → yellow → green → yellow → red.

The traffic light should run continuously in a loop.

Task 2

Goal: Create a program where the sprite draws a line with a length set by the user.

Requirements:

The sprite asks the user to enter a number.

The sprite draws a line whose length equals the entered number.

Task 3

Goal: Create a program where the sprite runs away from the cursor when clicked.

Requirements:

When the sprite is clicked, it moves to a random position on the screen.

The sprite can move instantly or with smooth animation (optional).

The behavior repeats every time the sprite is clicked.

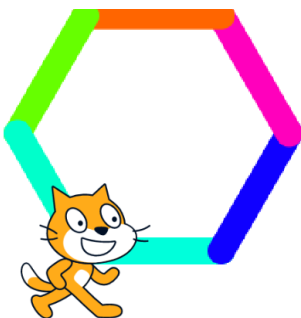
Task 4

Goal: Create a program where the sprite draws a hexagon with different colors on each side.

Requirements:

The sprite draws a hexagon.

The pen color changes on each side (each side has a different color).



Task 5

Goal: Create a program in Scratch where the sprite changes its size when keys are pressed.

Requirements:

When the Up arrow key is pressed, the sprite increases its size by 5%.

When the Down arrow key is pressed, the sprite decreases its size by 5%.

When the Space key is pressed, the sprite returns to 100% size.

The size change should work every time the corresponding keys are pressed.

Task 6

Goal: Create a program in Scratch with an animation of clouds moving across the stage.

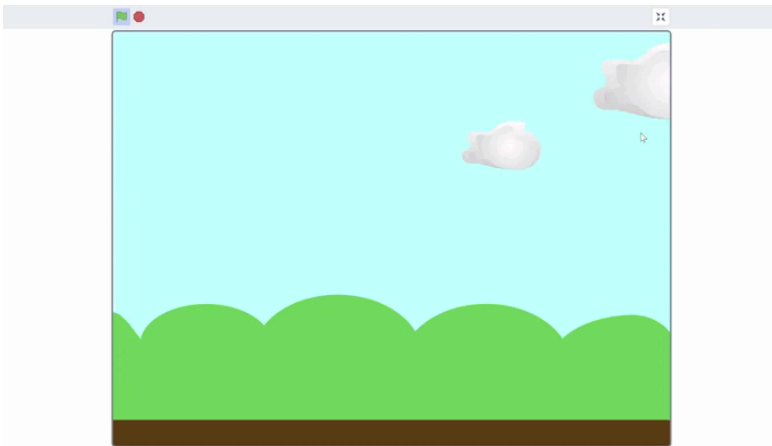
Requirements:

Draw two cloud sprites.

One cloud moves to the right, the other moves to the left.

When a cloud reaches the edge of the stage, it appears on the opposite side.

The cloud movement animation should run continuously.



Task 7

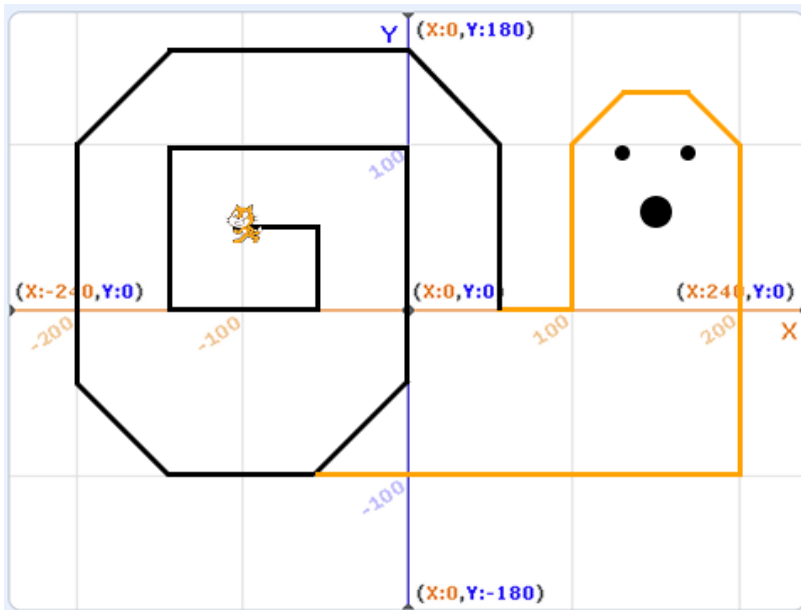
Goal: Create a program in Scratch where the sprite draws an image on a grid.

Requirements:

The sprite moves along a predefined path on the grid.

The sprite draws the picture according to the sample using the Pen tool.

Full credit is given only if the colors and the shape exactly match the sample.



Task 8

Goal: Create a program in Scratch where the Flower sprite rotates when keys are pressed.

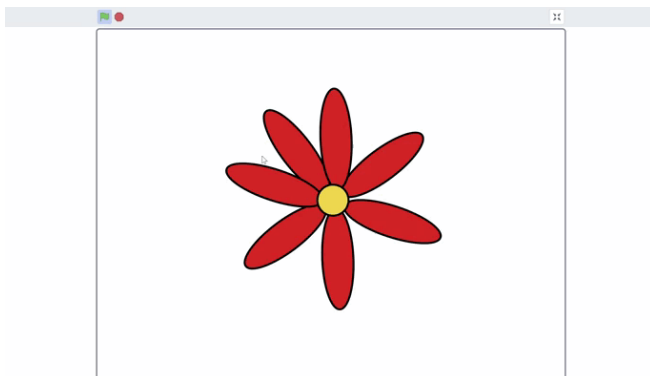
Requirements:

Draw a Flower sprite.

When the Right arrow (\rightarrow) key is pressed, the sprite rotates clockwise.

When the Left arrow (\leftarrow) key is pressed, the sprite rotates counterclockwise.

The rotation should occur every time the corresponding keys are pressed.



Medium challenges

Task 1

Goal: Create a program in Scratch where the sprite calculates the user's monthly expenses.

Requirements:

The sprite asks the user: "How much money do you spend per day?"

After the number is entered, the sprite calculates the total for 30 days.

The sprite says: "In a month you spend ___ dollars," inserting the calculated value.

Task 2

Goal: Create a program in Scratch where the sprite draws a square based on the entered side length.

Requirements:

The sprite asks the user: "Enter the side length of the square."

After the number is entered, the sprite draws a square with the given side length.

The square must be correct, with all sides equal.

Task 3 – Difference of Numbers

Goal: Create a program in Scratch where the sprite calculates the difference between two numbers.

Requirements:

The sprite asks the user: "Enter the first number."

The sprite asks the user: "Enter the second number."

After both numbers are entered, the sprite says: "The difference is {number1 – number2}."

Task 4

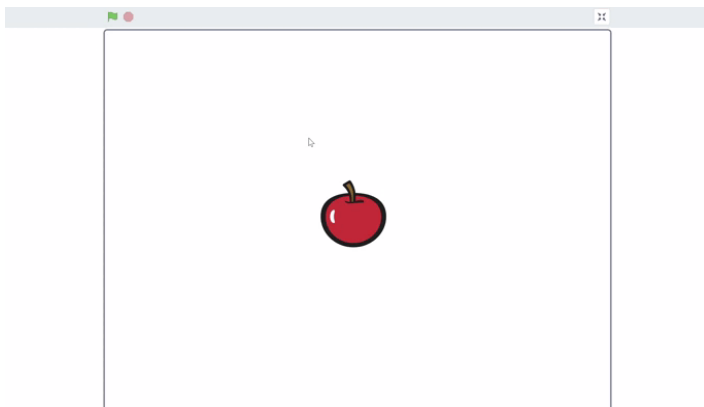
Goal: Create a program in Scratch where the apple sprite displays a given number of apples on the screen.

Requirements:

The Apple sprite asks the user: "How many apples can you eat?"

After the number is entered, that many apples appear on the stage.

The apples are placed randomly in different parts of the stage.



Task 5

Goal: Create a program in Scratch where the Cat sprite draws a hexagon with different-

colored sides and leaves clones at each vertex.

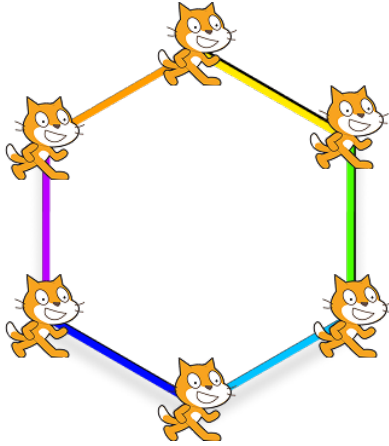
Requirements:

The Cat sprite moves along the path of a hexagon.

Each side of the hexagon is drawn in a new color.

At each vertex of the hexagon, the sprite creates a clone of itself.

The program should display all clones and the multicolored hexagon at the same time.



Task 6

Goal: Create a Scratch game called “Cat and Mouse.”

Requirements:

The Mouse sprite follows the mouse pointer.

The Cat sprite chases the mouse.

If the cat touches the mouse, the game ends.

Task 7

Goal: Create a program in Scratch with sprite control and clones.

Requirements:

Set the Shark sprite size to 50%.

Control the sprite using the arrow keys: ↑, ↓, →, ←.

When the Space key is pressed, a clone of the sprite is created.

Each clone rotates 10 degrees clockwise 30 times, then deletes itself.

Task 8 – Student Performance Evaluation

Goal: Create a program that evaluates a student’s performance based on the entered grade and displays a message. The sprite also changes its costume depending on the result.

Requirements:

The sprite asks the user to enter a grade (a number from 1 to 10).

The program performs different actions depending on the grade.

Program logic:

- If the grade is less than 3

The sprite says: “You need to study harder!”

The sprite switches to a sad costume.

- If the grade is from 3 to 6 (inclusive)

The sprite says: “You are doing okay, but you can do better!”

The sprite switches to a normal costume.

- If the grade is from 7 to 8 (inclusive)

The sprite says: "Good job! Keep it up!"

The sprite switches to a happy costume.

- If the grade is 9 or higher

The sprite says: "Excellent! You are a top student!"

The sprite switches to a superhero/star costume.

Hard challenges

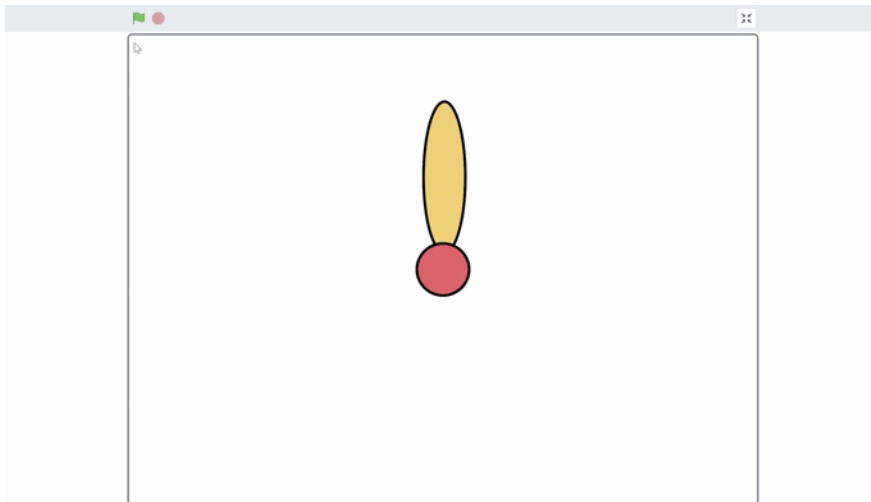
Task 1

Goal: Create a program in Scratch where the sprite draws a flower with a specified number of petals.

Requirements:

The sprite asks the user: "Enter a number N."

After the number is entered, the sprite draws a flower with N petals.



Task 2

Goal: Create a program in Scratch with sprite interaction and clones.

Requirements:

Add two sprites: Dragonfly and Frog.

The Dragonfly sprite asks the user: "How many clones of itself should be created?"

Example: If the user enters 2, two dragonfly clones are created.

The clones move to random positions on the stage.

If a dragonfly touches the frog, the clone is deleted.

The **Frog** sprite is controlled by following the mouse pointer.

Task 3 – Math Quiz

Goal: Create a Scratch program — a subtraction math quiz.

Requirements:

The sprite generates two random numbers: a and b.

The sprite asks the user: "What is the difference $a - b$?"

If the answer is correct, the sprite says: "Correct!"

If the answer is incorrect, the sprite asks the user to try again.

The question repeats until the correct answer is entered.

Task 4 – Universal Unit Converter

Goal: Create a Scratch program — a universal unit converter.

Requirements:

The sprite asks the user: "Enter a number N in centimeters."

The sprite asks: "Convert to which unit? (millimeters, meters, kilometers)"

The program performs the correct calculation:

to millimeters: $N \times 10$

to meters: $N \div 100$

to kilometers: $N \div 100000$

The sprite says the result in the format: "123 cm = 1230 mm," inserting the entered number and the selected unit.