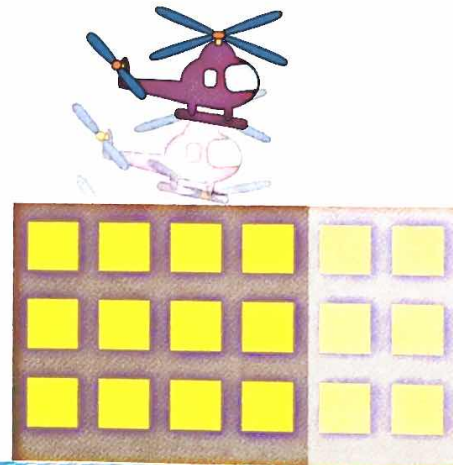# HELICOPTER PILOT

This flying game uses some of the same coding techniques as *Flappy Fish* (page 38). The player has to fly a helicopter over skyscrapers. A variable is used to code the helicopter's up and down flight. We'll use a calculation with a variable (see page 37) to create a sound effect that changes with the helicopter's speed.

Score   11

1 Start a new file in Scratch. Delete the cat sprite. Click **Backdrops** and fill in the background.

2 In the Sprites Pane, click the **Choose sprite from library** button. Choose the **Helicopter** sprite. Then click **OK**.

Sprite Library

Helicopter

3 We will create another costume for the helicopter to make it look as if the rotor blades are spinning. Click the **Costumes** tab then **right-click** the **helicopter**. (On older Macs, hold **Ctrl**, then click.) Click **Duplicate**. A second costume should appear.
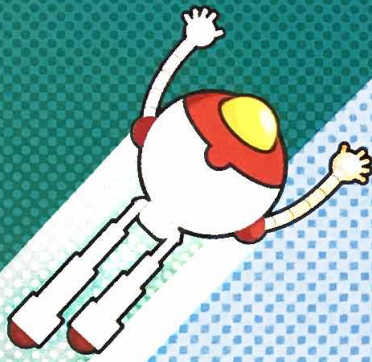
Scripts   Costumes   Sounds

New costume:
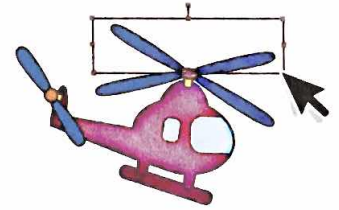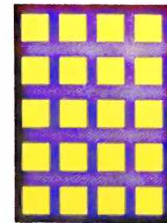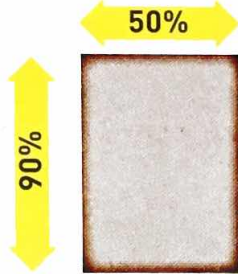
helicopter

info
duplicate
delete

4 Click the **Select** tool. Draw a selection box around the rotor blades. Click the **Flip left-right** button.

5 Start the skyscraper by clicking **Paint new sprite**. Use solid rectangles to draw a tall skyscraper.

50%

90%

6 Click the **helicopter** in the Sprites Pane. Now click the **Scripts** tab. In the **Data** group, create two variables—one called **Score** and the other called **Speed**.

Now create this code. For an explanation of how the **Speed** variable changes the helicopter's flight, turn to page 37.

```
when [green flag] clicked
set Score to 0
set size to 50 %
set Speed to 0
go to x: -50 y: 0
repeat until < touching edge ? >
    next costume
    change Speed by -0.1
    if < key up arrow pressed? > then
        change Speed by 0.5
    point in direction (90 + 5 * Speed)
    change y by Speed
broadcast Game Over
```

Run code when the **green flag** is clicked.

Set the score to 0 at the start of the game.

Shrink the helicopter to 50% of its size.

Set the helicopter's speed to 0 at the start of the game.

Start the helicopter roughly in the center of the Stage.

Loop this code until the helicopter hits the edge:

Make the rotor blade animation work by showing the next costume.

Reduce the vertical speed very slightly.

If the Up arrow is pressed:

Increase the vertical speed. By increasing it a small amount, the movement will look smoother.

This will make the helicopter point at 90 degrees if the speed is 0. As the value of **Speed** increases, the helicopter will gradually point downward.

Move the helicopter up if its speed is high, or down if its speed is a negative number.

When the helicopter hits the edge, broadcast "Game over" to let the other sprites know they need to stop.
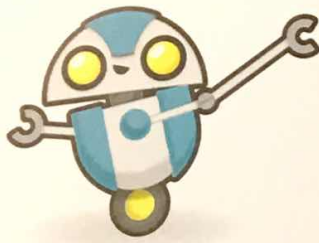
```
when I receive Game Over
say Game Over!
```

If the helicopter hits the skyscraper, it will receive a message, running this code:

Show a "Game Over!" speech box.

7 Click on the **skyscraper** in the Sprites Pane. Add this code to it:

```
when [green flag] clicked ─────────────── Run code when the green flag is clicked.
go to x: [300] y: [-250] ─────────────── Start the skyscraper on the right, low down.
repeat until < touching [Helicopter ▼] ? > ─── Loop until hit by the helicopter:
    change x by [-3] ────────────────── Move skyscraper slowly left.
    if < x position < [-300] > then ───── If it has reached the left side:
        go to x: [300] y: [pick random [-80] to [-280]] ── Move it to the right side, and give it a random y value.
        change [Score ▼] by [1] ─────── Increase the score.

broadcast [Game Over ▼] ──────────── If the sprites collide, broadcast a message so the helicopter knows it has hit the skyscraper.
```

> Change -300 to -260 or -200 if the skyscraper sticks to the left side of the Stage.

8 In the Sprites Pane, click on the **Stage** and add this code:

```
when [green flag] clicked ─────────────── Run code when the green flag is clicked.
forever ───────────────────────────── Loop this code forever:
    play note [6] + [Speed] for [0.1] beats ── Play sound effect. Make the sound pitch get higher as the value of Speed increases.

when I receive [Game Over ▼] ────────── If the helicopter hits the skyscraper, the skyscraper will broadcast a message, running this code:
play sound [snap ▼] until done ──────── Play sound effect.
stop [all ▼] ──────────────────────── Stop any code running.
```

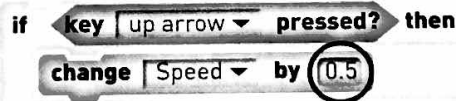> Try adding similar sound effects to the Stage in other games.

[green flag] **Now test your code.**

EXPERIMENT

- In step 6, alter the value that **Speed** is changed by in the **Change Speed by 0.5** block when the **Up** arrow key is pressed. Try slightly larger or smaller values, such as 0.7 or 0.3.

```
if  key [ up arrow ▼  pressed? ] then
    change [ Speed ▼  by ( 0.5 )
```

- Also in step 6, change the number 5 in the **Point in direction 90 + 5 * Speed** block. Try numbers like 3 or 7. Does this make the game look more or less realistic? Does it change how the helicopter moves?

```
point in direction [ 90 ] + [ 5 ] * [ Speed ]
```

- Experiment with the values in the sound effects attached to the Stage (step 8). Can you make the pitch of the sound higher or lower? Does this make the game more realistic?

CHALLENGES

- Try to make the rotor blade at the back of the helicopter rotate, too. Hint: Flip the rotor blades in the same way as is shown in step 4.

- Display the score when the game is over.

- Make the skyscraper move faster as the score goes up. Hint: You will need to make changes to the **Change x by -3** block in step 7.

- Compose a tune to play at the beginning of the game and another to play when the helicopter hits the skyscraper.

- Add a timer to your game.

- Add an animation to your skyscraper, so the lights in its windows turn on and off as you play.

- Design your own helicopter game. What is the aim of your game? What backdrop will you use? Are there any sprites in the game apart from the helicopter? Will you need to use variables?