

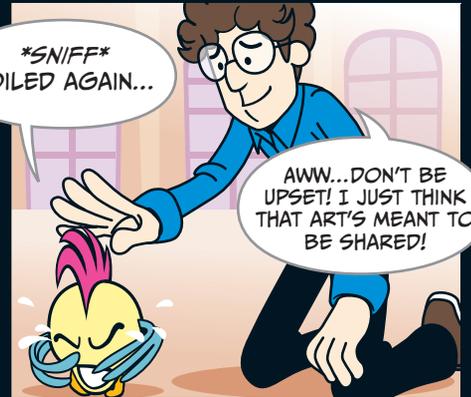
**DEFEND
HONG KONG'S
TECHNOCORE**

4 STAGE



STAGE

4





HACK ATTACK

4 STAGE

+ Chapter Focus

Learn to control sprites with the mouse, program objects to bounce back, and start a game by pressing the spacebar.

The Game

Help Scratchy attack flying viruses and stop them from touching the server at the bottom of the screen. If you successfully block 30 viruses, you win the game!



Let's start by opening the blank project **04 - Hack Attack!.sb2** (File ► Upload from your computer). I used a sparkly photo of Hong Kong's skyline as my Stage. You can use whatever you like!

Did you know you can add programs to the Stage, too? We can add this program to make our city glow!

```
when I receive start
  clear graphic effects
  forever
    repeat 2
      wait 0.3 secs
      change brightness effect by -5
    repeat 2
      wait 0.3 secs
      change brightness effect by 5
```

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Now let's take a look at the **Instructions** sprite. It tells the player how the game works. We'll write two programs to control it.



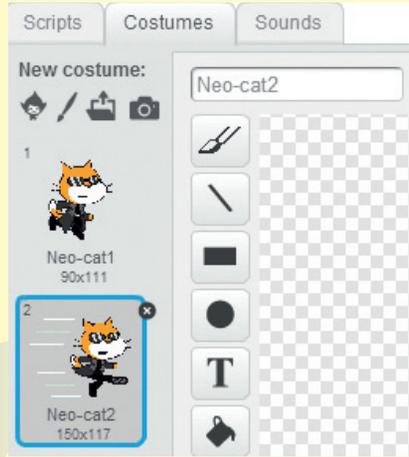
```
1 when green flag clicked
  go to x: 0 y: 0
  show
  forever loop
    if key space pressed? then
      broadcast space
      hide
  end
end

2 when I receive space
  broadcast start
```

Program 1 makes the sprite show up at the start of the game and disappear when the player presses **space**, the spacebar on their keyboard.

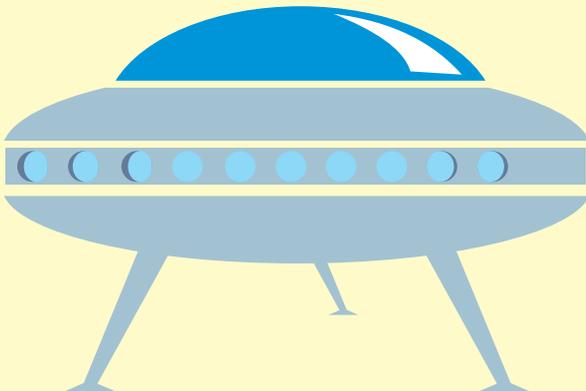
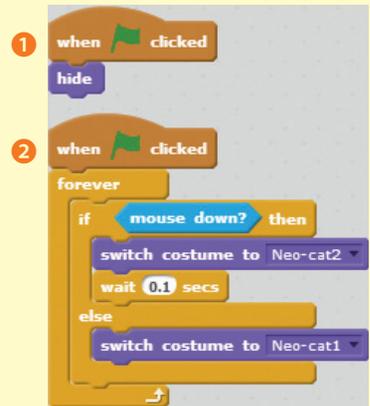
Program 2 makes the Instructions sprite broadcast **start** when it receives the **space** broadcast from program 1. This will start the game!





Next, let's write some programs for Scratchy. Notice that he has two costumes already: one where he's just standing and another where he's jumping.

So let's add some programs to control how Scratchy looks. In program 1, we hide him before the start broadcast is received. In program 2, we control how Scratchy switches costumes. Whenever the player's mouse is clicked—that is, whenever mouse down?—Scratchy looks like he's jumping.



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```
3 when I receive start
  go to x: -185 y: -115
  point in direction 90
  go to front
  show
  forever
    if mouse down? then
      point towards mouse-pointer
      glide 0.1 secs to x: mouse x y: mouse y

4 when I receive Oh
  say OH NO!! for 0.3 secs
```

But how does the player control Scratchy? Program 3 lets you control Scratchy with the mouse, showing him only when the **start** broadcast is received.

Program 4 makes a speech bubble saying "OH NO!!" appear whenever the Scratchy sprite receives the **Oh** signal. We'll broadcast **Oh** whenever a virus manages to hit the server.

Tip: By using the mouse instead of the keyboard, the player has a lot of control over Scratchy, who will move very quickly for this game. But remember—every game is different! Sometimes the keyboard works well, too.

Time to program a new sprite! Switch to the **Server**. It should look like the image below, but we want it centered and at the bottom of the screen. Add this simple program so that the Server appears in the correct place.

```
when I receive start
  go to x: 0 y: -176
```

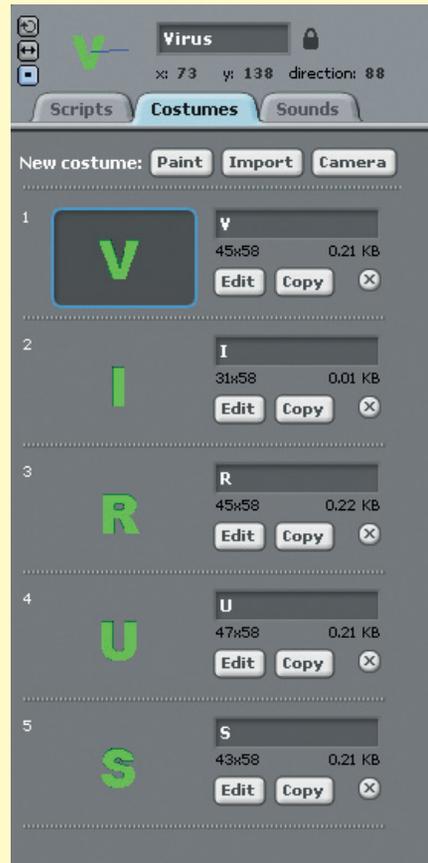
x: 0
y: -176



Next, we'll program our computer opponent! The sprite called **Virus** has a set of costumes of letters spelling V-I-R-U-S.

Program 1 hides the Virus until the game starts. Program 2 makes the Virus switch costumes as it flies around.

```
1 when green flag clicked
  hide
2 when I receive start
  switch costume to V
  show
  forever
    wait 0.3 secs
    next costume
```



Program 3 for the Virus makes it fly around. It bounces whenever it bumps into Scratchy or the edges of the screen.

```
3 when I receive start
  go to x: 0 y: 165
  point towards Neo-cat
  forever
    if touching Neo-cat ? then
      point in direction pick random 45 to -45
    move 10 steps
    if on edge, bounce
```

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Now we'll add more programs to the Virus to keep score. These programs use blocks from the **Control**, **Events**, and **Data** palettes to record and signal the conditions for winning and losing.

Program 4 creates a new variable called **score** and the conditions we need to meet for the script to broadcast **win**. Your score will now appear on the Stage.

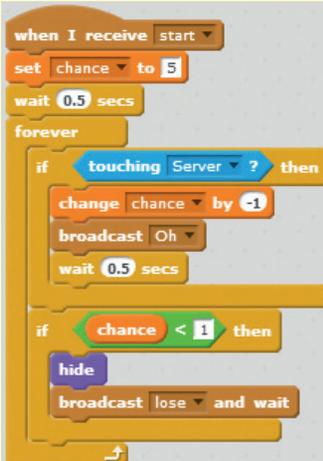
4



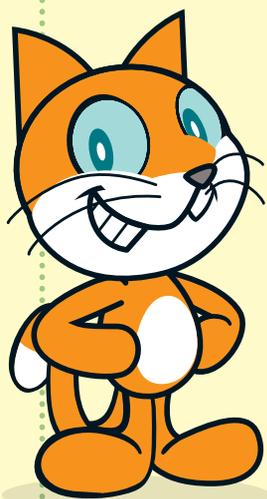
```
when I receive start
  set score to 0
  wait 0.5 secs
  forever
    if touching Neo-cat ? then
      change score by 1
      wait 0.5 secs
    if score > 29 then
      hide
      broadcast win and wait
      stop all
```

Program 5 creates a variable called **chance**, which keeps track of how many times the Virus is allowed to touch the Server sprite before the player loses. We'll give Scratchy five chances to start. When you're out of chances, the program broadcasts **lose**. Just like the player's **score**, the number of tries the player has left is displayed on the Stage as **chance**.

5



```
when I receive start
  set chance to 5
  wait 0.5 secs
  forever
    if touching Server ? then
      change chance by -1
      broadcast Oh
      wait 0.5 secs
    if chance < 1 then
      hide
      broadcast lose and wait
```



Tip: When setting the rules for winning and losing in your games, use the greater-than symbol (>) or the less-than symbol (<) instead of the equal sign (=), as we do in programs 4 and 5. This will prevent the game from breaking when a variable changes too quickly!

Why might the variable change too fast in this game? Scratchy might touch the Virus a few times in quick succession, and the program won't realize that you've won the game.

Now let's look at the sprite for the winning screen. Programs 1 and 2 keep it hidden. Then program 3 makes it appear when the **win** broadcast is received from the Virus sprite.

```
1 when green flag clicked
  hide

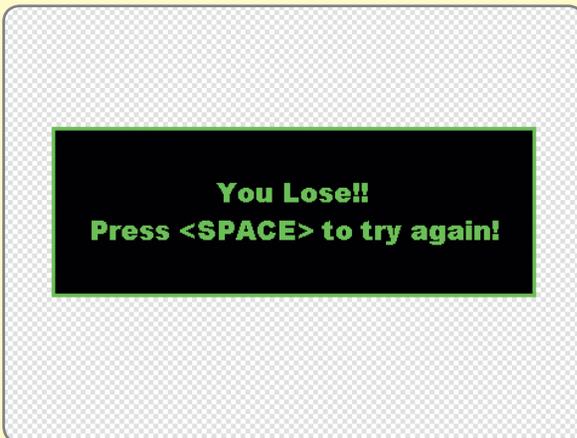
2 when I receive space
  hide

3 when I receive win
  go to x: 0 y: 0
  go to front
  show
```



The losing screen is pretty similar to the winning screen. To save time, we can select the **Duplicate** tool and click the winning screen to copy both the image and the programming!

All we need to do now is change the costume and the last program a bit.



```
when green flag clicked
  hide

when I receive space
  hide

when I receive lose
  go to x: 0 y: 0
  go to front
  show
```

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We're finished! After you save the file, hurry and help Scratchy the hacker defend the network from the virus attack!

Scratchy's Challenge!!

How would you make this game harder for the player? How about adding different kinds of viruses? What about turning this game into a two-player Ping-Pong match? Give it a try!

