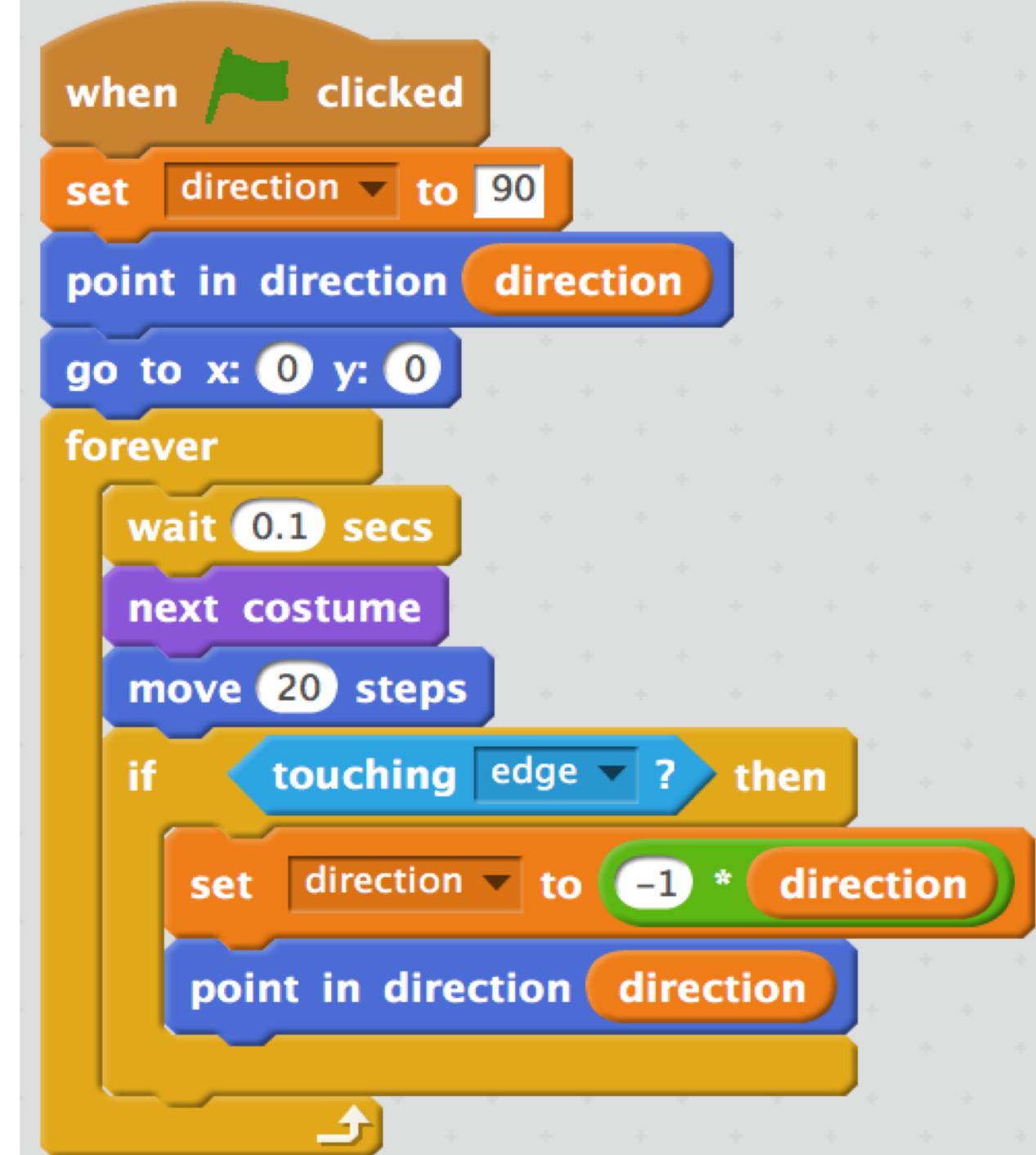


Programmering og Problemløsning

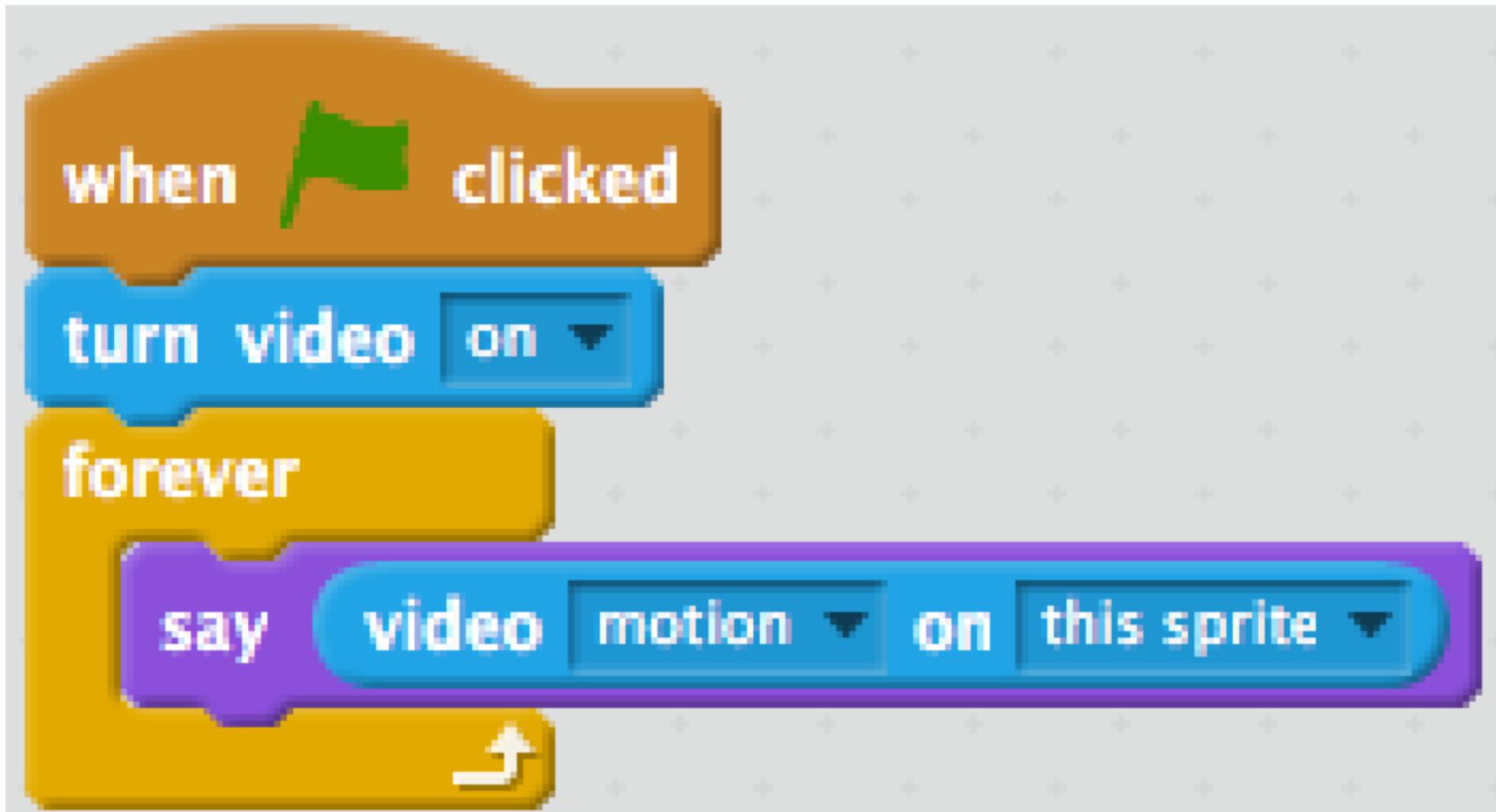
1.3: Scratch

Nøglekoncepter

- Værdi
 - Løkke
 - Variabel
 - Kommunikation
-
- Initial starttilstand
 - Betingelser
 - Udtryk
 - Tilfældigt tal



Motion detection: What does it do?



Hvad gør programmet?

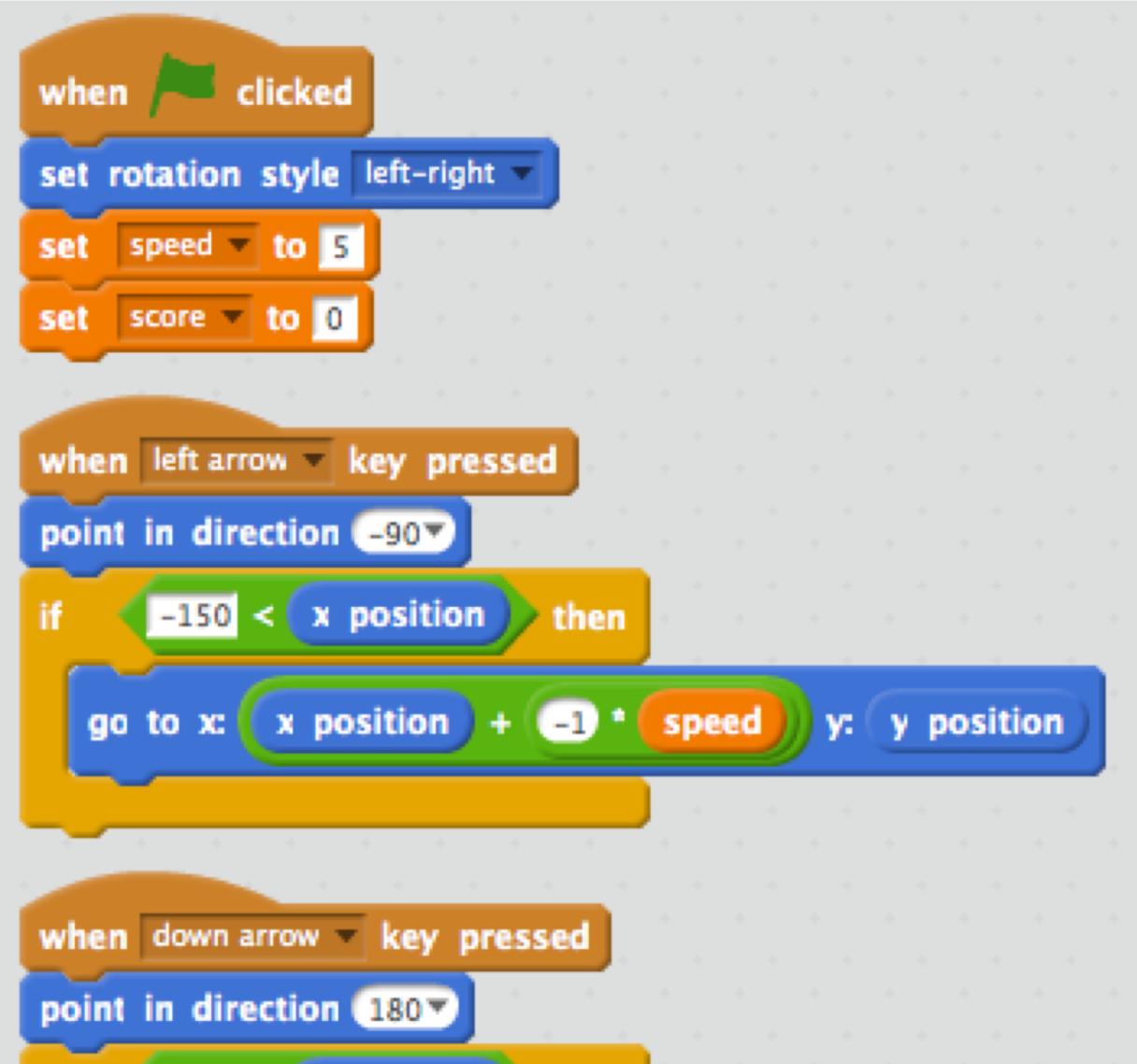
<https://tinyurl.com/y7b9zdb6>



Online programming: Collect computers

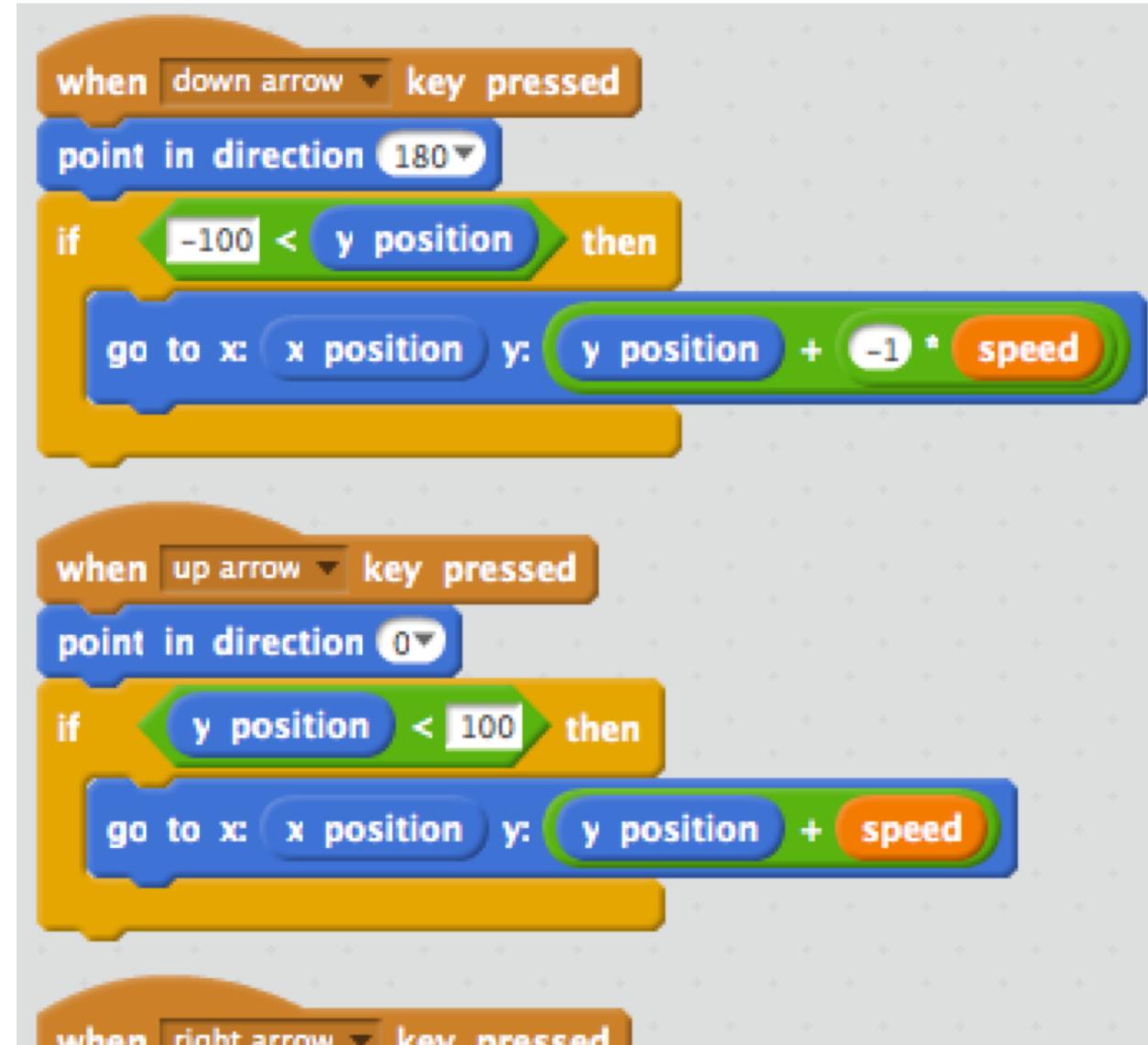
- Bruger kontrollerer playable-character (pc)
- Objekt placeres tilfældigt på skærmen
- Bruger får point, når pc rammer objekt, hvorefter objekt forsvinder og nyt placeres tilfældigt.
- Point vises på skærmen

Online programming: Collect computers - PC



A Scratch script consisting of three procedures:

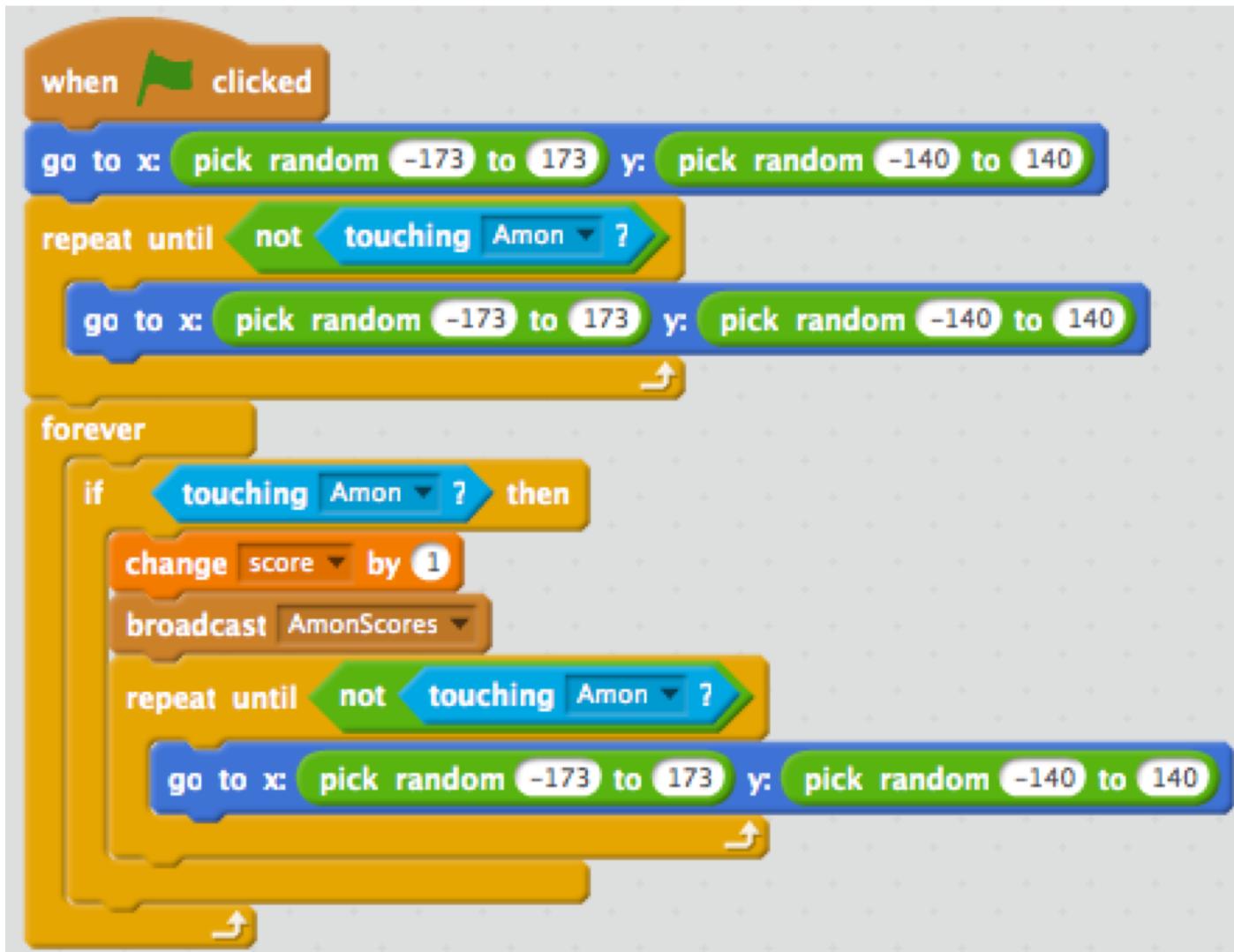
- when green flag clicked**: Sets rotation style to left-right, speed to 5, and score to 0.
- when left arrow key pressed**: Points in direction -90, checks if x position < -150, and if true, moves to x: x position + -1 * speed, y: y position.
- when down arrow key pressed**: Points in direction 180.



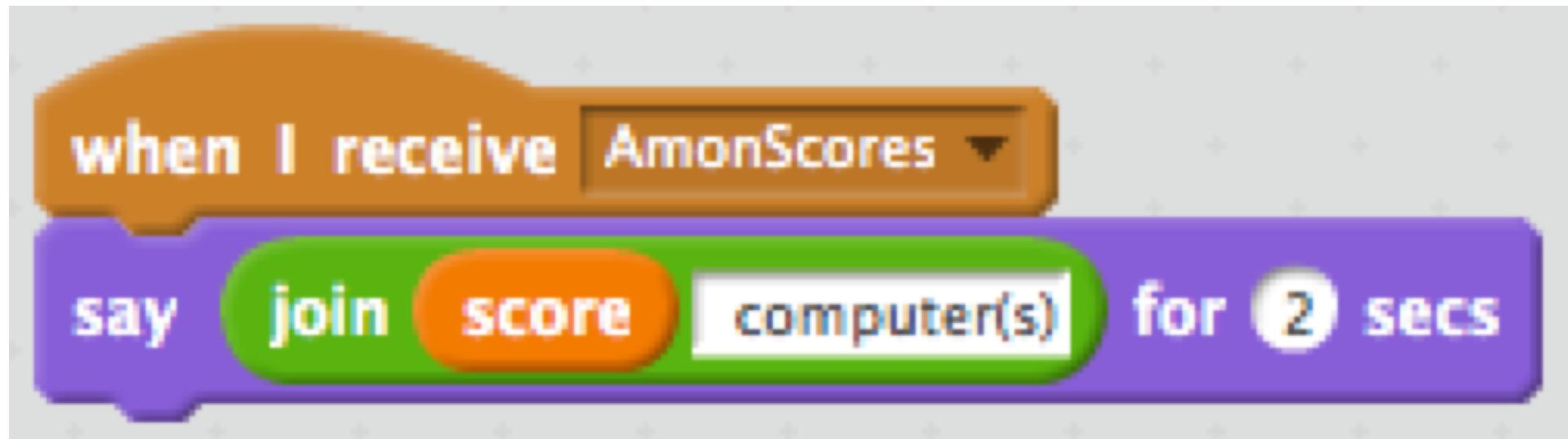
A Scratch script consisting of three procedures:

- when down arrow key pressed**: Points in direction 180, checks if y position < -100, and if true, moves to x: x position, y: y position + -1 * speed.
- when up arrow key pressed**: Points in direction 0, checks if y position < 100, and if true, moves to x: x position, y: y position + speed.
- when right arrow key pressed**: (partially visible)

Online programming: Collect computers - Obj



Online programming: Collect computers - Points



Online programming: Collect computers

Run Collect Computers

Fysiksimulering: rakketaffyring og landing

- Spiller styrer en rakkets acceleration
- Rakketten simulerer Newtons ligninger med tyngdekraft og brugerstyrret acceleration
- Hvis hastigheden er for stor, når den lander, så skal der skrives en sjov besked

Fysiksimulering: rakketaffyring og landing

$$f = m \ a$$

$$f_r = f_1 + f_2$$

$$m \ a_r = m \ a_1 + m \ a_2$$

$$a_r = a_1 + a_2$$

$$a = v'$$

$$v = p'$$

$$a_0 = 9.82 \frac{m}{s^2}$$

$$g'(t) \sim \frac{g(t+h) - g(t)}{h}$$

$$g(t+h) = g(t) + hg'(t)$$

$$\begin{aligned} v(t+h) &= v(t) + h \ a(t) \\ p(t+h) &= p(t) + h \ v(t) \end{aligned}$$

$$a(t) = \left[0, -\frac{9.82m}{s^2} \right] + u(t)$$

$$\begin{aligned} v(0) &= [0, 0] \\ p(0) &= [0, 0] \end{aligned}$$

Fysiksimulering: rakketaffyring og landing

```
when green flag clicked
set h to 0.5
set a_x to 0
set a_y to -9.82
set v_x to 10
set v_y to 60
set p_x to 0
set p_y to -150
set t to 0
go to x: p_x y: p_y
point in direction 90
```

```
point in direction 90
switch costume to spaceship-a
forever
change v_x by h * a_x
change v_y by h * a_y
change p_x by h * v_x
change p_y by h * v_y
change t by h
glide h secs to x: p_x y: p_y
```

Fysiksimulering: rakketaffyring og landing

Run Space landing Simple

Fysiksimulering: rakketaffyring og landing

Run Space landing