Introduction to Computer Programming

2.1 Control Flow - Demos

Example

Print two variables, a and b only if they are *both* greater than 10.

In [3]:
```python
a = 11
b = 5

if a > 10 and b > 10:
    print(a, b)
```

Example

A digital thermostat checks the current temperature read by a sensor and compares it to a preset temperature.

The heating is switched:

- **ON** if the current temperature is lower than the preset temperature
- **OFF** if the current temperature is higher than, or the same as, the preset temperature

Write a program to simulate the behaviour of the digital thermostat, by using a variable temp to represent the current temperature.

In [6]:
```python
temp = 18    # Temperature
preset = 20 # Preset temperature

if temp < preset:
    heat = True

else:
    heat = False

print(heat)
```
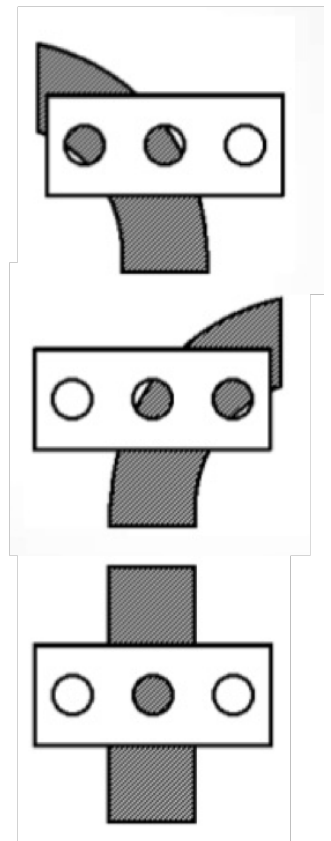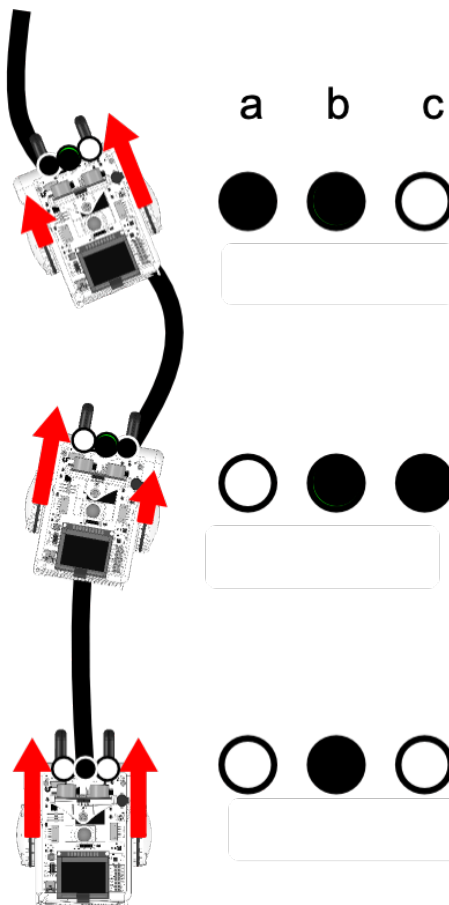
True

Example

A two-wheeled robot uses three sensors (a, b and c) to follow a black line on a white surface.

The sensors output:

- 0 if over a white surface
- 1 if over a black surface

The arrows show what relative speed of the two wheels should be, depending on the output of the sensors.

Write a program to simulate the robot's control system by representing the outputs of each sensors as a variable.

In [ ]:
```python
a, b, c = 0, 0, 0

if a == 1 and b == 1 and c == 0:
    left = 1
    right = 2

elif a == 0 and b == 1 and c == 1:
    left = 2
    right = 1

elif a == 0 and b == 1 and c == 0:
    left = 2
    right = 2

else:
    left = 0
    right = 0

print(left, right)
```

In [9]:
```python
a, b, c = 0, 1, 0

if a and b and not c:
    left = 1
    right = 2

elif not a and b and c:
    left = 2
    right = 1

elif not a and b and not c:
    left = 1
    right = 1

else:
    left = 0
    right = 0

print(left, right)
```

```
1 1
```

In [ ]: