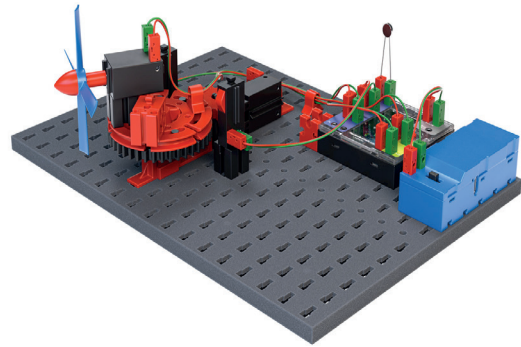


# Model 6: Fan

## Objectives and classification

### Overview

The model introduces an analog sensor (thermistor). A step control for a fan is programmed. The rotation of the fan propeller is implemented as a parallel program.



### Topics

What is an „analog sensor“? What is a „threshold value“? How can you run programs in parallel in Scratch?

### New component: the heat sensor (NTC resistor)

Please refer to the separate tutorial on the heat sensor.

### Learning objectives

- Evaluation of an „analog sensor“ (thermistor)
- Determination of threshold values
- Programming a step control with threshold values in Scratch
- Programming parallel programs in Scratch

### Time required

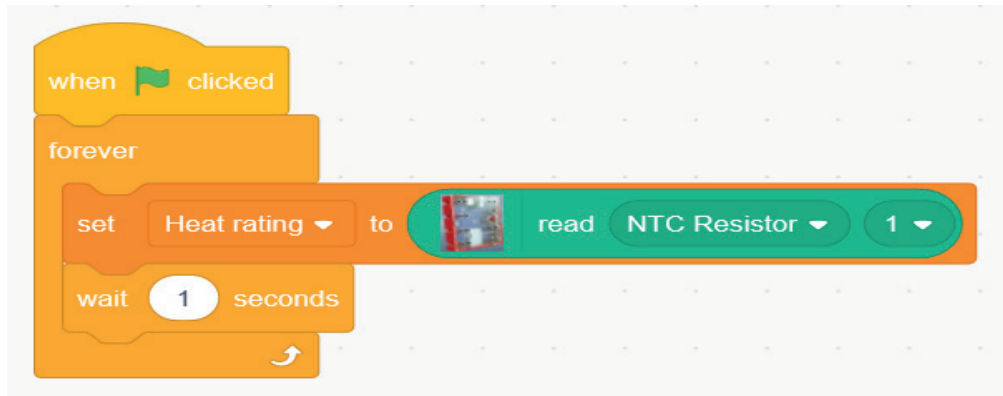
It should take half an hour to set up the fan. The heat measurement should also be completed in the same lesson.

The step control is challenging, so a whole lesson should be scheduled. The programming of the fan rotation is based on the results of model 4 (barrier) and should therefore be easy to solve for the students. The Smart Fan experimental task is more time-consuming due to the temperature measurements. Here, the different measured values could be tabulated together in order to shorten the processing time of the task.

## Solutions and notes

# Programming tasks Model 6: Fan

Solution Measure heat:



Heat measurement.sb3

# Solutions and notes

## Programming tasks 6 Fan

**Solution Step control:** Measured minimum/maximum value: approx. 1190/1510 (difference: 320) Divided into 8 steps of 40 (1190 - 1230 - 1270 - ... - 1510)  
Evaluation from the highest to the lowest threshold.



```

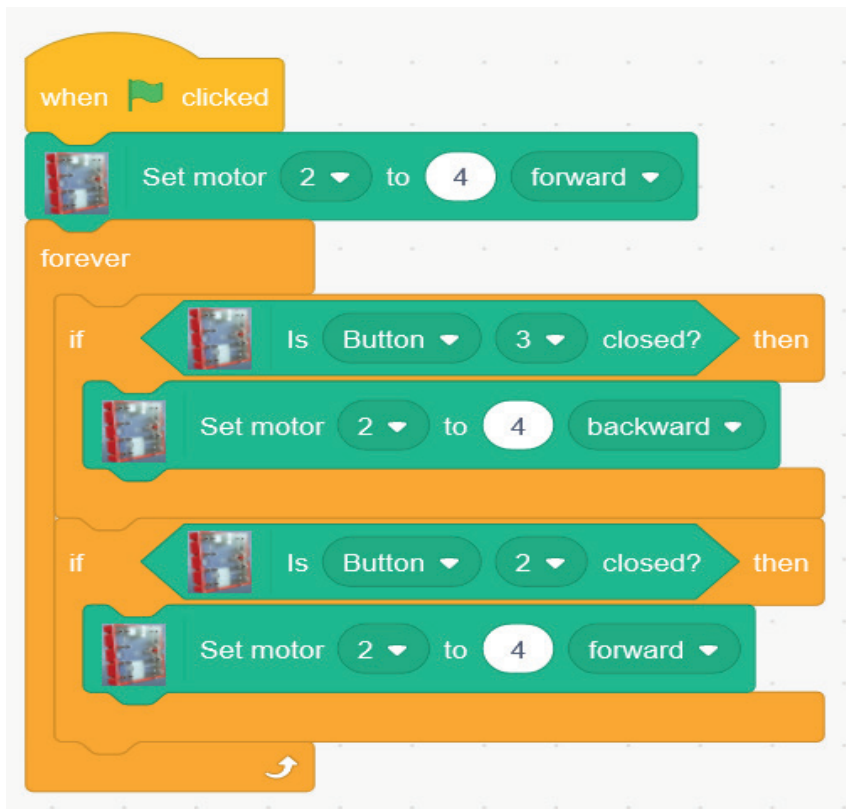
when green flag clicked
  set Stage to 0
  forever loop
    set Heat rating to read NTC Resistor 1
    if Heat rating > 1470 then
      set Stage to 1
    else
      if Heat rating > 1430 then
        set Stage to 2
      else
        if Heat rating > 1390 then
          set Stage to 3
        else
          if Heat rating > 1350 then
            set Stage to 4
          else
            if Heat rating > 1310 then
              set Stage to 5
            else
              if Heat rating > 1270 then
                set Stage to 6
              else
                if Heat rating > 1230 then
                  set Stage to 7
                else
                  set Stage to 8
    Set motor 1 to Stage forward
  
```

fan step control.sb3

## Solutions and notes

# Programming tasks Model 6: Fan

Solution Fan rotation:



Fan rotation.sb3

# Solutions and notes

## Programming tasks Model 6: Fan

Solution for the smart fan:



```

when clicked
  Set motor 2 to 4 forward
  forever
    if Is Button 3 closed? then
      Set motor 2 to 4 backward
    if Is Button 2 closed? then
      Set motor 2 to 4 forward

when clicked
  set Stage to 0
  forever
    set Heat rating to read NTC Resistor 1
    if Heat rating > 1470 then
      set Stage to 1
    else
      if Heat rating > 1430 then
        set Stage to 2
      else
        if Heat rating > 1390 then
          set Stage to 3
        else
          if Heat rating > 1350 then
            set Stage to 4
          else
            if Heat rating > 1310 then
              set Stage to 5
            else
              if Heat rating > 1270 then
                set Stage to 6
              else
                if Heat rating > 1230 then
                  set Stage to 7
                else
                  set Stage to 8
    Set motor 1 to Stage forward
  
```

Smarter fan.sb3