

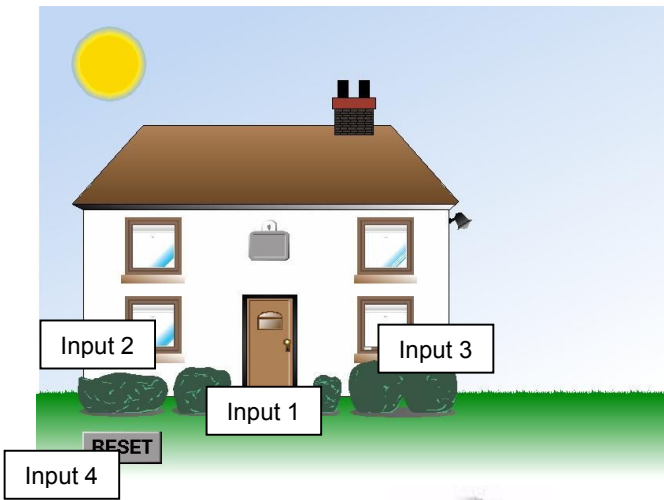
1 Burglar alarm

You should have worked through the Funfair Display and Haunted House sheets before you do this one.

The house is fitted with a burglar alarm. There is a **sensor** on each one of the downstairs windows, and another one on the door.

There is also a RESET button for the alarm.

The sensors and RESET button are **inputs**.

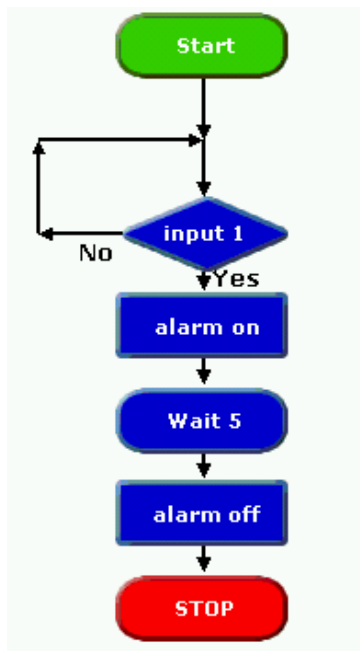


The alarm is Output 1



1. Build this program to set off the alarm for 5 seconds when someone opens the door.

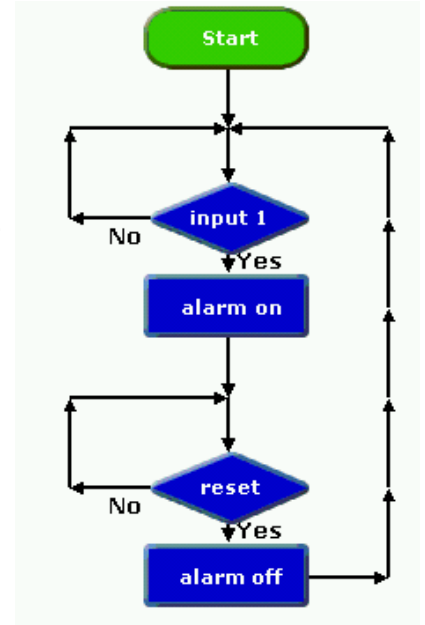
Run the program. Click on the door to check that this sets off the alarm.



2. Now edit your program as shown below, to keep the alarm on until you press the RESET button.

Run the program. Click on the door to set off the alarm.

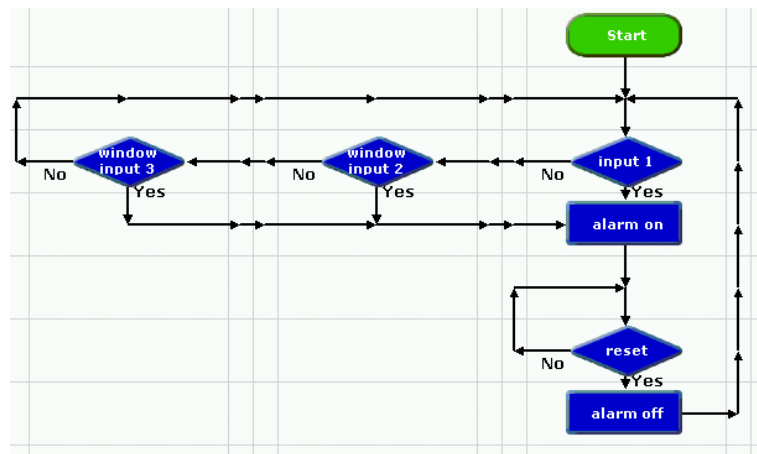
Click on the RESET button to switch off the alarm. This also sends the program back to the start, to begin checking the sensor again.



!! You will need to click on the door to close it again, before you click on the RESET button. Can you see why?

3. Now extend your program so that it checks the sensors on the two windows as well as the sensor on the door.

The picture below shows what your program should look like. Take care to set all the commands correctly and draw all the lines in the right direction.



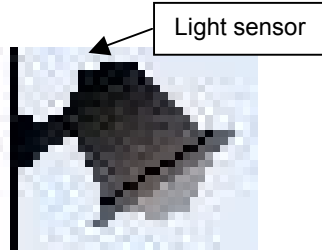
Run the program. Check that the alarm is set off if you click on the door or either one of the downstairs windows.

2 Using a light sensor

The house is also fitted with a system that can switch on a security light automatically when it gets dark.

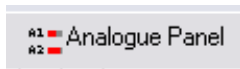
There is a light sensor on the security light.

This sensor measures how much daylight is shining on it.



The Analogue Panel shows the reading from the sensor.

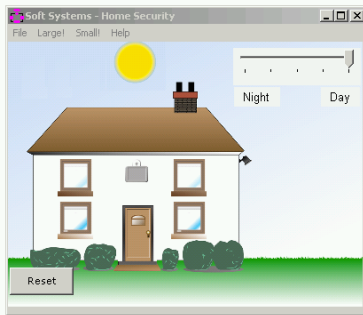
Click this button to display the Analogue Panel.



The light sensor is **Sensor A1**. Its reading is displayed here:



Use the slider on the picture to change from Day to Night, and watch the sensor reading change.



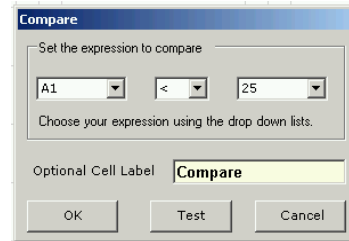
Now follow these instructions to write a program to switch on the security light automatically when it gets dark.

1. Place a Compare command two spaces under Start.



Double click on the Compare command.

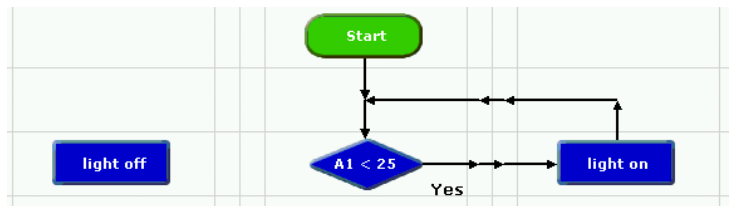
Select **A1** from the first box. Select **<** ("less than") from the second box. Type **25** in the third box. Click OK.



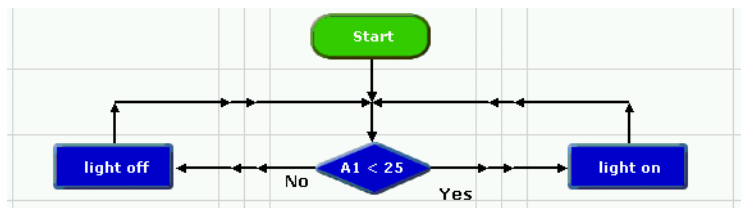
2. The security light is **Output 2**. Place an Outputs command on either side of the Compare command. Set one to switch the light on. Set the other to switch the light off.



3. Draw the "Yes" line from the Compare command like this:



4. Draw the "No" line from the Compare command like this:

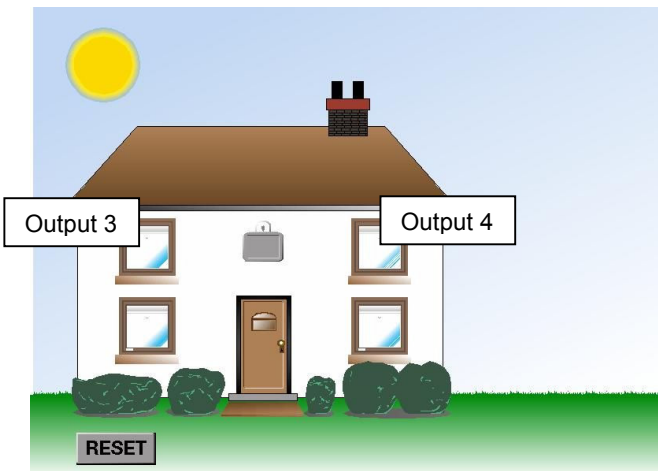


5. Run the program to test it. Move the slider from Day to Night, and check that the light switches on when the sensor reading is less than 25. If the reading is more than 25, the light should switch off.

3 Build your own programs

Program One

Each one of the upstairs lights in the house is an Output. You can use them as part of the house security system.



When the people who live in the house go on holiday, they want to program the upstairs lights to switch on and off in a sequence through the day and night, to make it look as if they are still at home.

In the morning, the lights switch on at 6.00 am, and switch off at 8.00 am.

In the evening, they switch on at 5.00 pm, and switch off at 12.00 midnight.

Write a program that will do this. Use one second in your program to stand for one hour in the real system.

So a command of WAIT 6 will stand for 6 hours.



You can check your program by watching the Time panel as it runs. The Time panel is below the Commands list.



Remember: 5.00 pm will be 17, and midnight will be 24 – as in the 24-hour clock.

Program Two

Write a program which switches on the security light for 5 seconds whenever someone opens the door.



Program Three

Write a program that switches on the security light and both the upstairs lights automatically when it gets dark. The lights should switch off when it is daylight.



Program Four

Write a program that sets off the alarm and switches on the security light if someone opens either one of the downstairs windows. The alarm and security light are switched off when the RESET button is pressed.

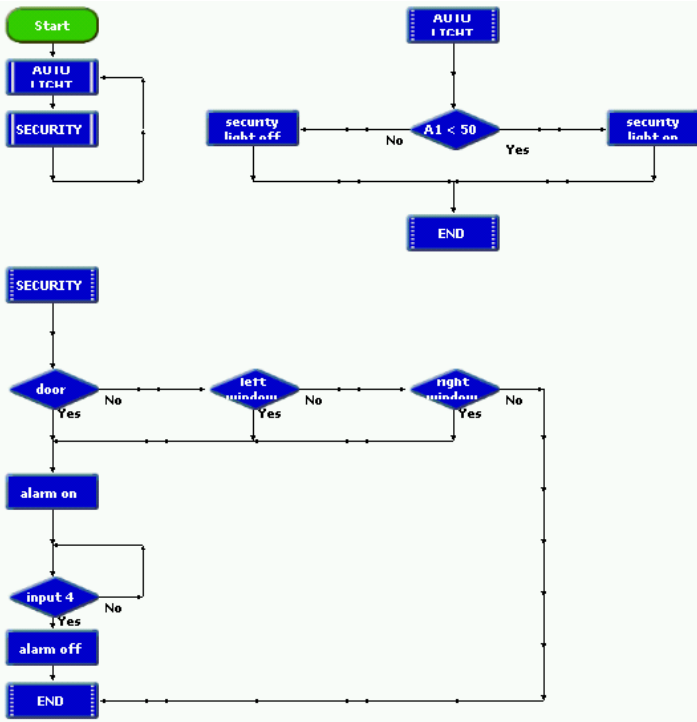
Test each program when you have built it.

Write a report about your home security control system, including copies of your programs.

4 Using procedures

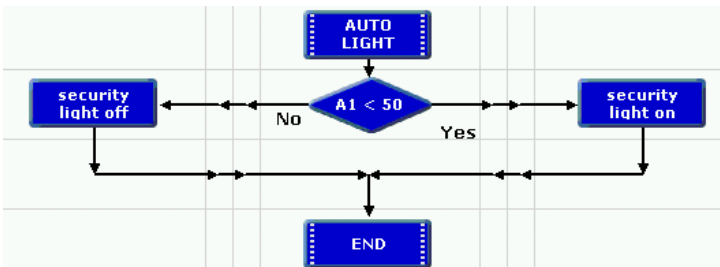
This sheet shows how you can use procedures to combine the automatic security light and the burglar alarm into one system.

The complete program looks like this.

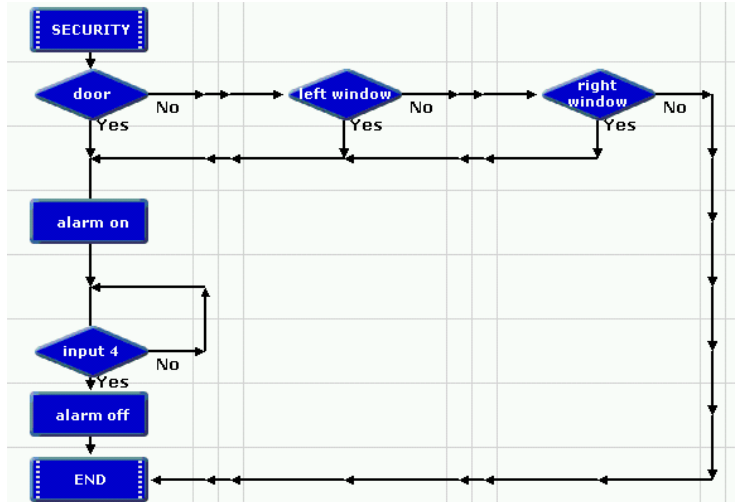


Follow the instructions below to build the program in sections.

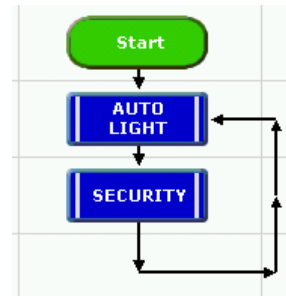
1. Build the AUTO LIGHT procedure shown here:



2. Build the SECURITY procedure shown here:



3. Build the main part of the program as shown here:



Run the program to test it. The security light should respond to light and dark all the time, and the alarm system should work all the time.

