# Video transcript

**Video 3.2: Reading and constructing a flowchart**

In this video we will look at flowcharts.

A flowchart is a way of representing a process or procedure in the form of a diagram.

Flowcharts can be used to show the required steps for a variety of processes, not just related   
to IT. For example, a flowchart could be used to show trouble-shooting steps for a domestic appliance such as a washing machine or TV, or the process required to apply for a bank loan. You could also use a flowchart as part of the design or development process when creating a user interface or dashboard.

Flowcharts use a defined set of shapes to represent different steps in the process and when drawing flowcharts you need to use the correct shapes.

Let’s look at an example flowchart. This flowchart shows the overall steps in ordering products from a website. It doesn’t show a lot of detail; in general flowcharts are best used this way, and   
if you try to show too much detail in a flowchart they can get very complex and difficult to draw.

Now let’s look at each step in detail.

The starting point for any flowchart is the start symbol, which just has the word START in it. This symbol has just one arrow leading out of it.

The first step in buying an item online is to search for what you are looking for, by entering search criteria such as 'men’s trainers' or 'headphones'. This requires a user input, so the shape used for this step of the process is as shown. A brief description of what is being input is written inside the box. Input boxes have one arrow going into them, and one coming out of them.

The next step in the process is for the user to look at the results of the search and identify the product required. This could be quite a complex process but for the sake of simplicity this is identified in the flowchart as a single process box, which uses a rectangle shape.

Once the required product has been found, it is added to the shopping basket. Again, this step is shown as a process rectangle. Process boxes, like input boxes, have one arrow going into them and one coming out.

The next step in the process requires a decision. Has the user finished shopping or do they want   
to find more items? This step is shown in the flowchart using a diamond-shaped box. The diamond should have a brief question in it and it should have two arrows coming out of it, one labelled yes and the other labelled no.

In this example the question is ‘are more products required?’. If the answer is yes, then the flowchart arrow goes back to the top of the process and begins again with the input of the search criteria. If the answer is no, then the next step in the process is to check out.

The checkout process is simplified into three steps in this example. Firstly, the user inputs their delivery details such as their address; this uses the input symbol.

The next step is for the user to input their payment details such as a debit card number. This is also shown as an input step.

The third stage is the authentication of the payment details. This is likely to be quite a complex stage, involving contacting the bank, but for simplicity’s sake this is just shown as a single   
process box.

Finally, there is a decision to be made: has the payment process been successful or not? This is shown using the diamond shaped decision box. If the answer is yes, then the order can be processed. If not, it is cancelled.

The order processing and the order cancelling steps are show as process boxes.

A flowchart always stops the way it starts with a lozenge shape, this time with the word Stop in it.

OK, so let’s just recap on the flowchart symbols.

A symbol called a terminator is used at the start and the end of the flowchart, with the start or stop in it.

The data symbol is used for input or output of data from the system.

The process symbol is used where a processing or calculation step is required.

And the decision symbol is used where a choice needs to be made.

OK, so we have looked at an example flowchart, and in a moment, we are going to look at drawing another example. However, you might find it helpful to pause the video and review what you have learned so far about drawing flowcharts.

The important skill for you to develop is to be able to take a written description of a process and draw a flowchart which illustrates the process.

For example, imagine you are answering a question like this.

The XYZ company is developing some software to calculate the final grades for a qualification. The software needs to do the following.

Collect marks for the three components which make up the qualification. Marks are out of 100, and to pass a component, a student must achieve at least 40 marks.

Check students have achieved at least a pass in all three components. Otherwise they are graded as ‘unclassified’.

Add together all the marks for the three components.

If they achieve less than 165 marks they are awarded a pass.

If they achieve between 165 and 199 marks, they are awarded a merit.

If they achieve over 199 marks, they are awarded a distinction.

In this type of question, the steps of the process are already outlined, so what you first need to decide is what type of step each one is: is it input or output, processing or decision?

Here we have listed the steps in a table, but you could just as easily annotate the scenario   
by hand.

The first step of collecting the marks is input.

Step two, checking the learners have achieved a pass in all components is a decision. The yes arrow from the decision box will continue in the flowchart, the no arrow will output a message saying that the student has an unclassified result.

Step three, adding together the marks is processing.

Step four, is a decision – is their total mark less than 165? If the answer is yes, then a Pass result should be output.

Step five is also a decision – is their total mark between 165 and 199? If the answer is yes, then a Merit result should be output.

Step six does not really need a decision because if they have reached this stage in the process they must have a mark over 199, so a Distinction result should be output.

Once you have worked out what type of step each part of the process is, you can draw the flowchart using the correct symbols for input, output, processing and decision.

So here is a flowchart showing the correct steps and symbols.

At the beginning is the Start symbol.

Step one is to input the marks.

Step two is a decision diamond to check all components are passed. If not, then a message showing an unclassified grade is output.

Step three is a process box, when all marks are added together.

Step four is another decision diamond. If the student has less than 165 marks, then output the Pass message.

Step five is a decision diamond. Has the student got between 165 and 199 marks? If yes, then output the Merit message.

Step six is to output the Distinction message as the student must have got over 200 or more marks.

And at the bottom, connect up the arrows and end with the Stop symbol.

Finally, a few tips for drawing flowcharts.

You will probably be drawing your flowcharts by hand. You might find it helpful to draft out a sketch of the flowchart before attempting the final version.

Keep the flowchart simple. Don’t worry about adding in a lot of detail. Keep the text inside each symbol brief but clear.

When hand drawing the symbol shapes, make sure it is clear what symbol shape you are using. The drawing does not have to be very neat, but it must be clear.