



# Cambridge NATIONALS in ICT

## Unit 8 – Introduction to Computer Programming

Assessment Log

Scenario

**TASKS**

Task 1

Task 2

Task 3



# Scenario

*Students studying for their Cambridge Nationals in ICT sometimes struggle to work out which grade they are likely to achieve.*

You will need to design and create a computer program to calculate what grade will be achieved after **all** unit grades have been entered.

**As an extension:** The program would be **even better** if it asked what course was being studied at the start then used this to work out the grade accurately after asking the user for the correct number of unit marks.

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# High Level Languages Types

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## Object Oriented

- Visual Basic
- Scratch

## Procedural

- Basic
- Java

This is the one  
we will be  
learning, using  
software called  
Small Basic.

## Scripting Languages

- VB Script
- Action Script (Flash)
- JavaScript

# Analysing Problems

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## Language choice

- What programming language are you going to use?

## Inputs

- What information goes *into* the program?

## Processes

- What is the program going to *do* with the inputs?

## Outputs

- What does the user need to get **out** of the system?

# Breaking Down Solutions

Before you can program a solution to a problem it needs to be broken down step-by-step . . .



Here's an example of making a cup of tea:

1. *Boil kettle*
2. *Add teabag, milk and sugar to a cup*
3. *Pour water into the cup*
4. *Strain the teabag and remove*
5. *Stir tea*

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# Algorithms – Flow diagrams



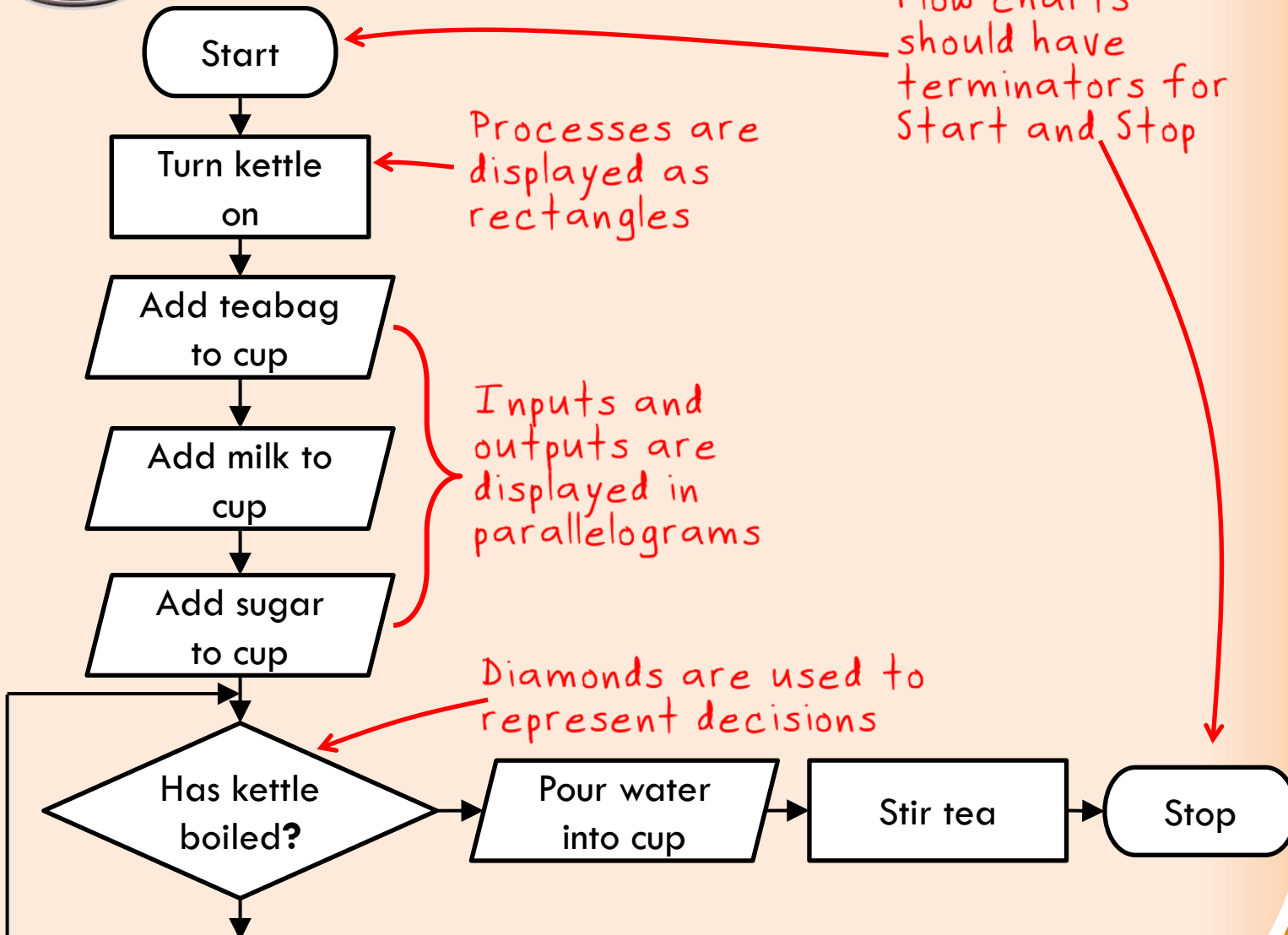
## Cup of tea flowchart example:

Flow charts should have terminators for Start and Stop

Processes are displayed as rectangles

Inputs and outputs are displayed in parallelograms

Diamonds are used to represent decisions



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# Algorithms – Structured English

Used to plan a program using a mixture of programming structures and plain English.



## Cup of tea structured English example:

```
Turn on Kettle  
Add teabag to cup  
Add milk to cup  
Add sugar to cup  
While Kettle is boiling  
    Wait  
End While  
Pour water into cup  
Stir tea
```

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# Success Criteria



When you've finished, how will you know your program has been a success?

**Success Criteria** are a list of points you wish to achieve in making the program. You can then use these points to measure the success of the program at the end.

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# Task 1

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Task 1 Info



## ✓ Analyse the Problem

- Explain the problem given in the scenario.
- Identify all of the inputs, outputs and processing requirements.
- Select a programming language and explain why you have selected this language, in comparison to other language choices.

## ✓ Plan a Solution

- Create a flowchart to demonstrate the solution.
- Explain the solution using Structured English.

## ✓ Success Criteria

- Identify Success Criteria that can be used later to determine the success of your program.

# Writing Code

**Variables to store data**

**Assignment operators to give values to variables**

**Relational operators to compare items**

**Mathematical operators to carry out calculations**

**Programming constructs:**

- Subroutines
- Selection
- Repetition

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# Annotating Code

Code is annotated to explain what each line does using a single quote.

Annotations appear in *green* and are not read by the program:

```
1 TextWindow.Title = "Hello World" 'This line adds a title to the window
2
3 TextWindow.Write ("What is your name? ") 'Displays the question
4
5 name = TextWindow.Read() 'This takes in the input from the user and stores it in a variable called "name"
6
7 TextWindow.WriteLine ("Hello " + name) 'Displays a greeting with the name at the end
8
```

*Annotation*

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# Task 2

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Task 2 Info

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## ✓ Creating the Computer Program

- Create the computer program you designed in Task 1 using *Small Basic*.

## ✓ Annotating the Code

- Annotate the code to identify and explain where you have used the following:
  - Variables
  - Assignment operators to store data (=)
  - Relational operators to make comparisons (<,>)
  - Mathematical operators to perform calculations (+,\*)
  - Programming constructs (selection, repetition, subroutines)

# Different Types of Error

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## Syntax

- Occurs when code has been entered incorrectly or spelt wrong.
- Program *may* still run depending on the error.

## Logic

- The program will run but won't behave as expected.

## Run-time

- Program won't run as a mistake has been made within the code.



# Test Plan

It is important to test ALL features of the program

Test Num.	Test Description	Expected Results	Pass?	Recommended Changes
1	Enter mark for First Unit	Program should prompt the user to enter the next unit mark.	✓	N/A
2				
3				
4				
5				
6				

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# Task 3

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Task 3 Info

## ✓ Test Plan

- Create a test plan and use this to test your final program.
- Take screenshots of each test and clearly number and annotate them to indicate which specific test they belong to and what they are showing.

## ✓ Evaluation

- Use the test results to identify and explain the good points and improvements you could make to the program.
- Compare your program to each of the success criteria you identified in Task 1, *clearly* explaining the extent to which you have met each of the criteria.