



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

LEVEL / LEFEL 4

MODULE CODE: D4X00997
Computational Thinking

ASSESSMENT TYPE/ MATH O ASESU: PRATICAL (OPEN BOOK)

ASSESSMENT/COMPONENT/ ASESAD/CYDRAN: 1

COMPONENT WEIGHTING/ PWYSAU'R CYDRAN: 100 %

WORD COUNT/ NIFER Y GEIRIAU: N/A

MODULE TUTOR / TIWTOR Y MODIWL: Geoff Dawkins

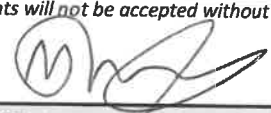
SUBMISSION DETAILS/ MANYLION CYFLWYNO:

- **Make sure that Your Name , Your Student P Number, Your Module Title, Assignment Title and Your Module Lecturer's Name are clearly shown on the front page of your assignment**
- **All assignments must be submitted electronically to Turnitin unless indicated by the module lecturer Paul John**
- **If a paper submission is required then it will be indicated on Moodle. You will then be required to submit the assignment parts in a suitable report folder– not in poly-pockets - to the library.**
- **This form (ALL PAGES) MUST be printed out, signed and submitted to the library separately from your electronic assignment submission. For paper submissions it must be attached to the front of the assignment and then submitted to the library.**
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School of Applied Computing ASSIGNMENT SPECIFICATION

Student name:	Matthew Overton	Student P number:	
Programme:	HNC/HND Computing and Information Systems		
Lecturer:	Geoff Dawkins	Internal Verifier:	Paul John
Assignment Title:	Test		
Hand Out Date:	See Moodle	Submission deadline:	See Moodle

Referencing:	In the main body of your submission you must give credit to authors on whose research your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have read or quoted in order to complete this assignment (e.g. for books: surname of author and initials, year of publication, <u>title of book</u> edition, publisher: place of publication).		
Disclosure:	I declare that this assignment is all my own work and that I have acknowledged all materials used from the published or unpublished works of other people. All references have been duly cited.		
Student's Signature:	<i>Assignments will not be accepted without a signature here</i> 	Date:	18.01.18
Late submission will result in a late penalty mark, as follows: Up to four weeks late, maximum mark of 40% for first attempts and 0% for resubmissions. (Academic Quality Handbook 2015/16 7.5 (5))			

Learning Outcomes tested (from module syllabus)
Understand software constructs and basic syntax.

Computational Thinking Test

Answer only the questions you can – if you cannot answer a question, move on to the next question. This test is not negatively marked, so you may wish to guess if unsure. Questions 1 and 2 to be answered on this paper, questions 3 and 4 to be answered using C# and saved.

Question 1

You have been selected to program a new robot intended to create hot drinks. The robot is capable of following simple, tea and coffee-oriented commands precisely, but has no understanding either of the process, or the fundamental principles which underpin it (e.g. that a kettle requires power). The robot has access to the following items:

- Kettle (initially unplugged)
- Tea bags
- Jar of ground instant coffee
- 1L carton of milk
- Unopened bag of sugar
- 1 metal tea spoon
- 1 large mug

- Access to a sink for water and an electrical socket for power

- a) You are required to give the robot the set of instructions (algorithm) necessary to successfully make a cup of milky coffee with 1 teaspoon of sugar. Each instruction should be on a new line. Ensure that your instructions are in a logical order and no steps are missed; while highly capable of following instructions, the robot cannot solve problems independently.

(17)

(PTO for more space)

Start.

Pick up kettle ✓

Open kettle lid ✓

Turn sink tap on ✓

Fill kettle $\frac{1}{2}$ full with water - any half? ✓

Turn sink tap off ✓

Close kettle lid

Plug kettle into electrical socket ✓

Put down kettle

Flick kettle on to boil ✓

Open jar of coffee ✓

Pick up spoon

Spoon 1 teaspoon of coffee into mug ✓

Close jar of coffee ✓

Open bag of sugar ✓

Spoon 1 teaspoon of sugar into mug ✓

Close bag of sugar

Put down spoon

Open carton of milk ✓

Pick up milk

Pour $\frac{1}{4}$ mug full of milk ✓

Put down milk

Close carton of milk

While No water in mug

If water in kettle is boiled ✓

Pick up kettle

Pour $\frac{3}{4}$ mug full of water ✓

Put down kettle

else

Flick kettle on to boil

wait for kettle to finish boiling ✓

End while

Pick up spoon ✓

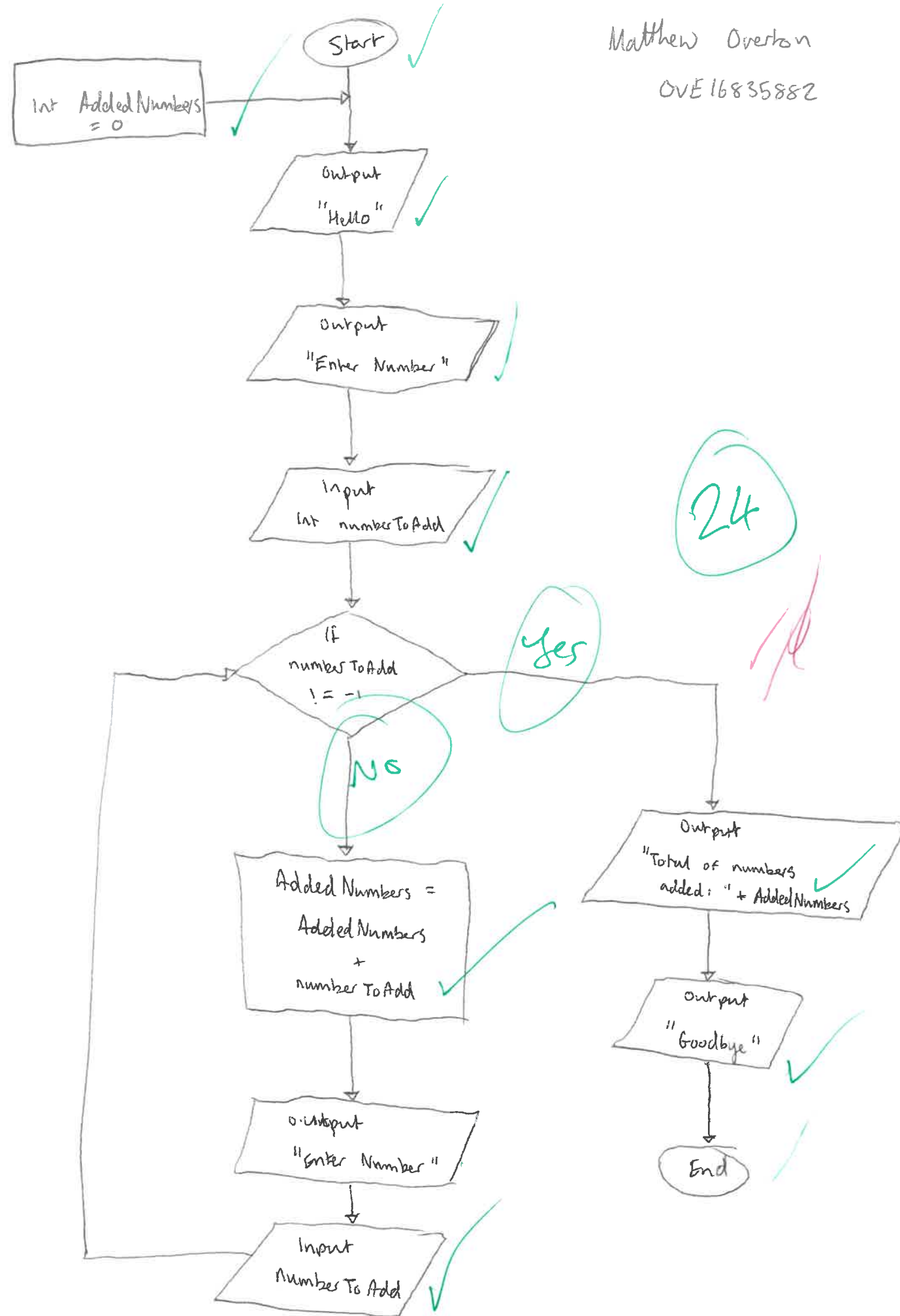
Stir mug

Put down spoon

End.

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- b) The robot is, of course, capable of making many variations of hot drink. The user must be permitted to give information about their drink preferences to the robot before it is created. What are the pieces of information the robot must collect (requirements) before starting?

How much milk you want. ✓ whether you want tea or coffee. ✓
What type of milk you want. ✓
What temperature of water. ✓
How many teaspoons of coffee. ✓
How many teaspoons of sugar. ✓

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- c) If the instructions were converted to code, explain briefly how this data may be stored. What is the name given to a piece of data stored by a computer? (5)

The data would be stored as a type of variable in RAM. ✓
It can be used within the scope it is initialized and then it is deleted. ✓

Boo

3 (3)

Question 2

- We have been given the requirements for a program which:
- a) Says “Hello” to the user at the start.
 - b) Reads a series of numbers from the user, adding them together.
 - c) Stops when the user inputs -1 as a value.
 - d) Once the user elects to stop inputting numbers, outputs the sum of the numbers input.
 - e) Says “Goodbye” to the user.

For example, the program may run something like:

Hello

Enter number:

8

Enter number:

10

Enter number:

3

Enter number:

-1

Your total is 21.

Goodbye.

Of course, the user may enter any set of numbers and get a valid result:

Hello

Enter number:

9

Enter number:

-1

Your total is 9.

Goodbye.

Write the flowchart for this program