



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:	James Sweeney	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I declare that this assignment is all my own work and that I have acknowledged all materials used from the published or unpublished works of other people.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> JSweeney	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:

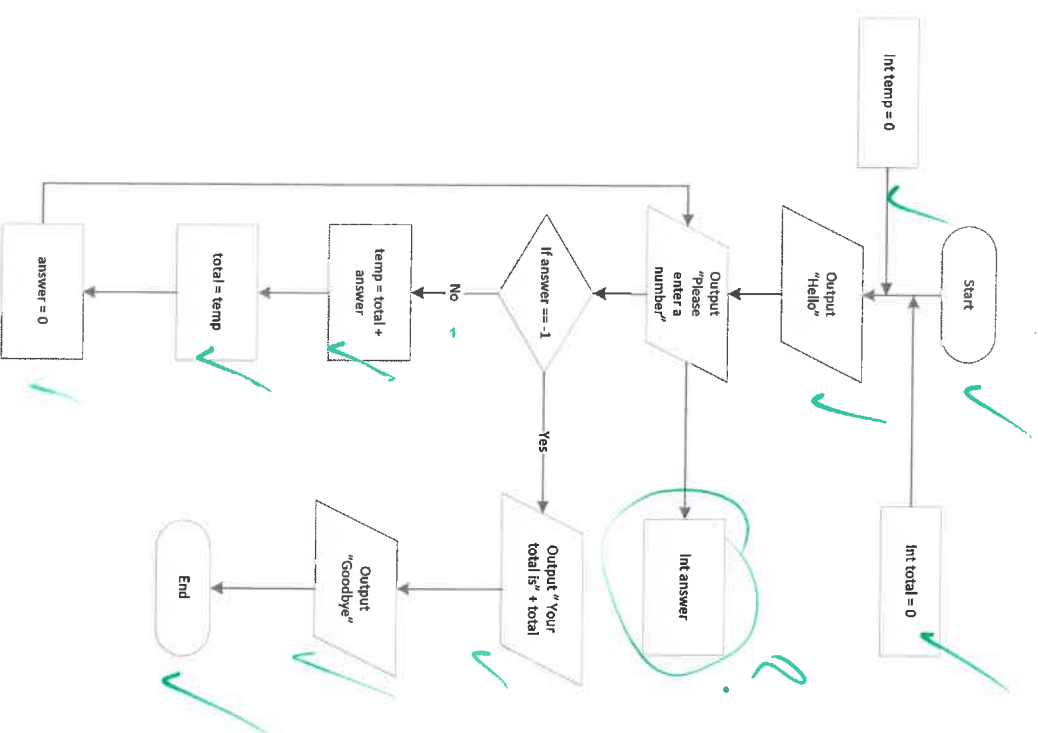
- Kettle (initially unplugged)
 - Tea bags
 - Jar of ground instant coffee
 - 1L carton of milk
 - Unopened bag of sugar
 - 1 metal tea spoon
 - 1 large mug
 - Access to a sink for water and an electrical socket for power
- a) You are required to give the robot the set of instructions (algorithm) necessary 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.

1. Place the large mug on the table ✓
2. Open the jar of ground instant coffee ✓
3. Pick up the tea spoon ✓
4. Place the teaspoon into the jar of coffee ✓
5. Lift the tea spoon with coffee on it ✓
6. Pour the coffee into the large mug
7. Lift the kettle ✓
8. Move to the sink whilst holding the kettle ✓
9. Open the top of the kettle.
10. Turn the left/cold tap 3/4 of a full turn clockwise
11. Pick up the kettle
12. Move the kettle so it is under the tap ✓

(PTO for more space)

(17)

13. While (KettleVolume > maximumVolume)
keep the kettle under the tap ✓
14. Turn the left ^{cap} 3/4 of a full turn anti
clockwise ✓
15. Assuming the kettle has a stand, place
the kettle on the stand ✓
16. Lift the plug of the kettle ✓
17. Move the plug to the electrical socket
18. Plug in the plug to the electrical socket
19. Turn the ⁵ socket power switch on ✓
20. Turn on the kettle
21. if (kettle != fullyBoiled)
wait for the kettle to fully boil
else ✓
22. Lift the kettle ✓
23. Move the kettle next to the mug
24. Tilt the kettle 45° ✓
25. While (~~kettle~~ mug != full)
keep tilting the kettle ✓
~~break if~~ ~~if~~ mug
26. Place the kettle back on the stand
27. Turn the electrical socket off
28. Pick up the teaspoon refer sheet 1



25

1.9)

29. ~~Rotate the~~ Place the spoon into the ~~may~~ mug30. ~~Rotate~~ the spoon around the circumference of the mug 5 times. # ✓

31. Open the carton of milk

32. Pour the required amount of milk into the mug. ✓

33. Close the carton of milk ✓

~~34. Open the bag of sugar~~ ✓

34. Rotate the spoon around the circumference of the mug 5 times.

35. Open the bag of sugar ✓

36. Remove the spoon from the ~~may~~ mug37. Place the spoon into the ~~bag~~ bag of sugar ✓~~38. Accumulate one teaspoon.~~

38. Take the full tea spoon out of the bag

39. Add the sugar to the mug

40. ~~Rotate~~ Place the tea spoon in the mug ✓

41. Rotate the spoon around the circumference of the mug 5 times

42. Remove the spoon from the mug ✓

This command could be saved as a method to reduce the likelihood of errors occurring. This method could be called rotateSpoon.

- 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?

The amount of coffee ✓
• The amount of milk ✓
• The amount of sugar ✓
• The strength of tea ✓
• What cups are being used ✓
How do you open the kettle ✓
How do you turn the kettle on ✓

(5)

- 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?

The data would be stored in a variable.
Variables are assigned a data type and a name and exist inside the scope of the program. ✓

(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