PRIFYSGOL ABERYSTWYTH UNIVERSITY

SEMESTER TWO 2025-2026

COMPUTER SCIENCE

CS02320 : FOUNDATION PROGRAMMING

Time allowed: **2 HOURS**

Answer all **FOUR** questions

All questions carry equal marks.

THIS IS A CLOSED BOOK EXAMINATION.

CALCULATORS ARE NOT PERMITTED.

STUDENTS MAY SUBMIT ANSWERS TO THIS PAPER IN EITHER WELSH OR ENGLISH

Once seated, students may complete the front cover of the answer book(s) and the attendance slip ONLY.

DO NOT TURN THE EXAMINATION QUESTION PAPER OVER UNTIL INSTRUCTED TO DO SO.

1. This question is about program design and computational thinking. “Computational thinking” is a useful tool in program design.

   a) List the four principal activities involved in computational thinking and program design. For each activity explain what it involves. [8 marks]

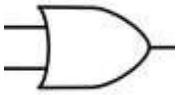
   b) A group of friends have asked you to help them plan a week long holiday to Scotland. Explain how any two of the activities in computational thinking might help you arrive at a plan for the day. [9 marks]

   c) A cafe sells freshly made paninis. Customers can have either cheese or chicken. With cheese, they can choose whether or not to have chorizo; with chicken they can choose whether or not to have bacon. In either case they choose whether or not to have lettuce and tomato. Use computational thinking techniquest to create an algorithm for getting a customer’s preferences and making the correct panini. You may use any approach you choose to represent your algorithm, provided it is clear. You can use simple steps (such as “add cheese”) for actually making the panini. [8 marks]

2. This question is about the logic gates and the CPU.

a) Name the following logic gates

(i)



(ii)



[4 marks]

b) What is the meaning of the line that is shown on the right side of the logic gate symbols? [1 mark]

c) Name the gate from the truth table below: [2 marks]

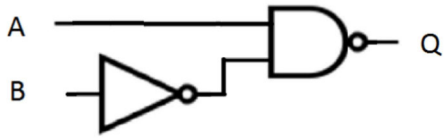
0	0	0
0	1	0
1	0	0
1	1	1

d) Name the gate from the truth table below: [2 marks]

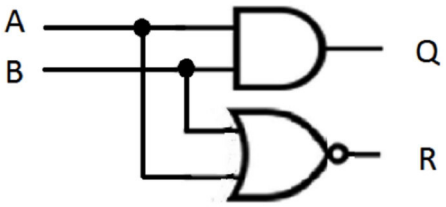
0	0	0
0	1	1
1	0	1
1	1	0

e) Calculate the full logic tables for the following circuits for each labelled intermediate and output point

(i)

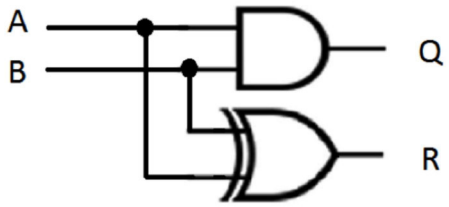


(ii)



[6 marks]

f)



(i) Name this common circuit.

(ii) What is it used for?

(iii) Calculate the full logic table [6 marks]

g) Convert each of the following numbers to both binary and hexadecimal

(i) 53

(ii) 27

[4 marks]

3. This question is about algorithms

a) What is the purpose of an *algorithm*? [5 marks]

b) In clear steps (either as written pseudocode, or a flow chart) indicate how you might find all the prime numbers between 250 and 1000. A prime number is one that can only be divided by 1 and itself (like 3, 5, 7, 11, etc.). [16 marks]

c) What steps have you taken (or might you take) to make your algorithm from part b) more efficient, and the parameters that you have considered in that answer? [4 marks]

4. This question is about programming paradigms and languages.

a) A programming language lets us write the instructions that enable a computer to do some task for us.

(i) Describe the differences between *compiled* languages and *interpreted* languages [4 marks]

(ii) Some programming languages are considered to be 'Write-Once-Run-Anywhere' - what does this mean and what are the advantages of this? [5 marks]

b) Programming paradigms are ways to classify languages based upon their features or characteristics.

(i) Name two programming paradigms, one *declarative* and one *imperative* and for each give one example of a language that belongs to that paradigm. [6 marks]

(ii) For those two paradigms explain in your own words what types of problem the paradigms are useful for solving and how the paradigm helps the programmer. [4 marks]

c) What are *primitive* data types and *composite* data types? Why might a programmer use a composite data type? [6 marks]

END OF PAPER