



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

Complete, fold and seal
(see note 2 below)

SURNAME: Freeman

FORENAME(S): Bailey

Examination Answer Books

12 Pages

Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.

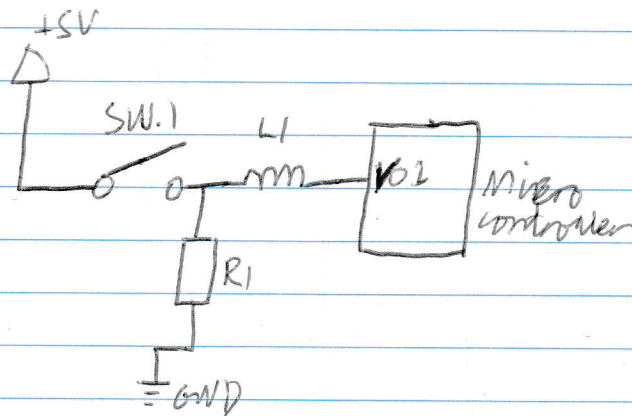
1	Student Number	2311418
2	Title of Examination Paper	Micro Peripherals and Interfaces
3	Module Code	ACDA4004
4	Date and Time of Examination	8/1/2025 09:00
5	Examination Venue	UW TSD 1Q 310
6	Seat Number	013
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
1	7½
2	5
3	3
4	10
5	4½
6	4
	34
Total	68½

7½
5
3
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34

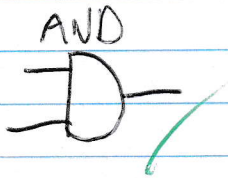
- 1a) RETURN is what is put at the end of a function to signal it's the end of that part of code and to either return to the main loop or to the top of the loop it's in.
- 1b) SLEEP will make the code inactive until there is an input made to wake it again.
- 1c) ADDLW means add a literal value to the w register so it will take a number specified in the code and the number stored in the active 'w' register and add them together.
- 1d) I wish I knew
- 1e) DECF mean decrement F so it will decrement the number stored in file directory 'F' by 1. basically $F - 1$.

2) ~~Inductor~~



An inductor could be placed between the switch and microcontroller to avoid any sudden rises in current. A diagram of how this would be connected is shown above. This will reduce the incidence of switch bounce because it will counteract any spikes in current causing there to be a slope in voltage up to logic level 1 rather than a quick on/off you get with switch bounce. A downside of this solution would be that there could be a slight delay due to the inductor slowing down the sudden current spike. Inductor values must be chosen carefully to reduce this

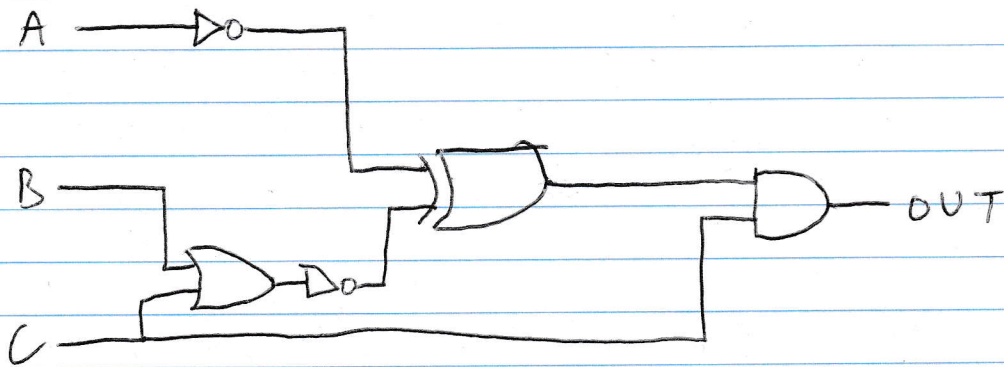
3)

~~21~~

A	B	Z
0	0	0
0	1	0
1	0	0
1	1	1

3

4)



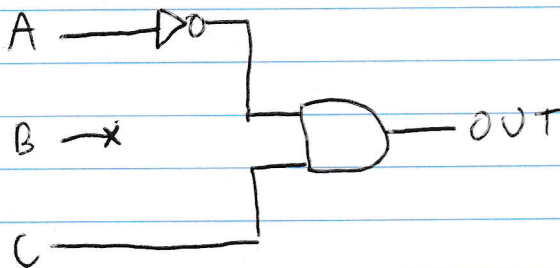
4a)

A	B	C	OUT	$C \cdot \bar{A}$
0	0	0	0	
0	0	1	1	
0	1	0	0	
0	1	1	1	
1	0	0	0	
1	0	1	0	
1	1	0	0	
1	1	1	0	

7

7

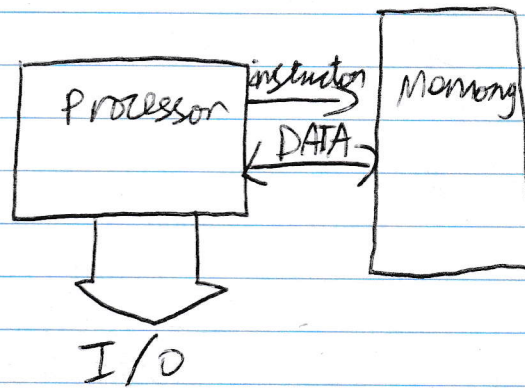
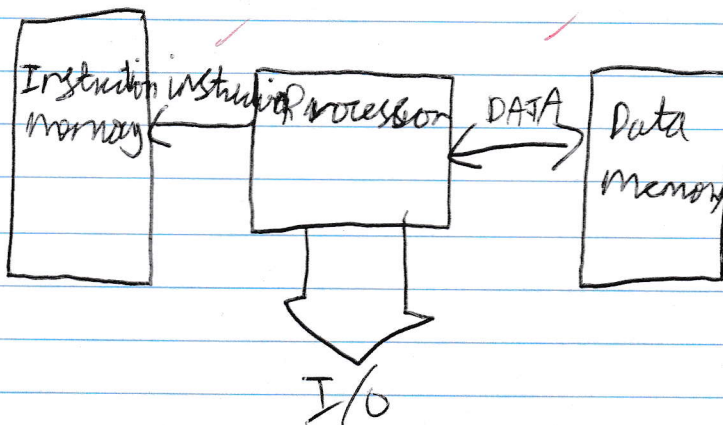
4b)



3

3

5)

Vonm NeumannHarvard

Vonm Neumann advantage: simpler so can be run at high speeds and the processor only has to deal with one memory type

Harvard advantage: can deal with more complex data and uses seperate instruction memory to be able to deal well with things like digital signal processing.

- 6) PWM (Pulse width modulation) is a type of digital signal that will be on or off for certain periods of time. For example in a space of 1 second if it is off for 500ms and on for 500ms it has a frequency of 1Hz and a duty cycle of 50%. If a PWM signal is put through a capacitor it will smooth the signal and average it out. So then a PWM signal with 50% duty cycle will average out to 50% of the operating voltage of the microcontroller. This concept can be used to ~~turn~~ turn digital PWM into various analogue voltages by varying the duty cycle. The faster the frequency of the PWM the smoother the analogue signal will be.

4

4