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Complete, fold and seal
(see note 2 below)

SURNAME: Balpitt

FORENAME(S): Edward

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 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	2317250
2	Title of Examination Paper	Microsand interfaces
3	Module Code	ACDA4004
4	Date and Time of Examination	08/01/25 09:00
5	Examination Venue	UWFSO
6	Seat Number	028
7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
ALL	
1	5
2	2
3	3
4	7
5	5
6	1
	23
	42
Total	46%

5
2
3
7
5
1
23

$f = f$ file register / address

$W =$ working register

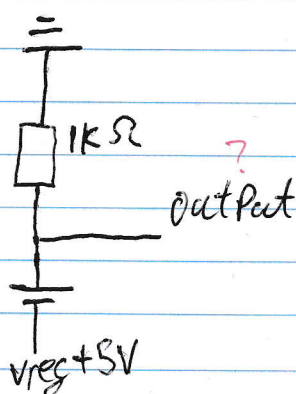
Question No.

Examiner Only

1.
 - a Return, Returns from sub routine
 - b SLEEP, go into Standby
 - c ADD Literal with W, adds literal with working register
 - d Bit check f , bit check check if bit is set 1/0
 - e Decrement f , decrements f by one

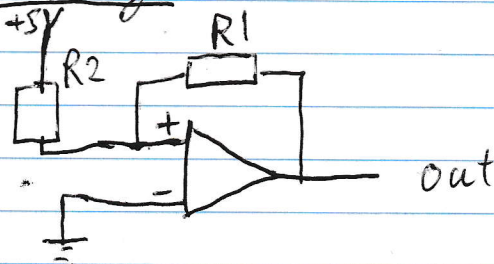
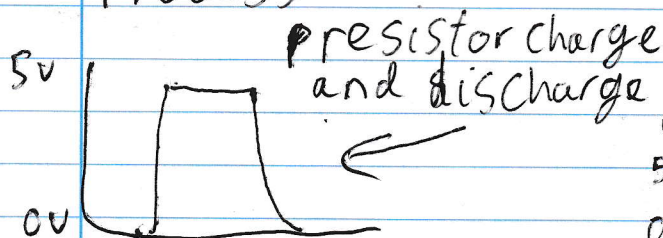
2.

Debounce



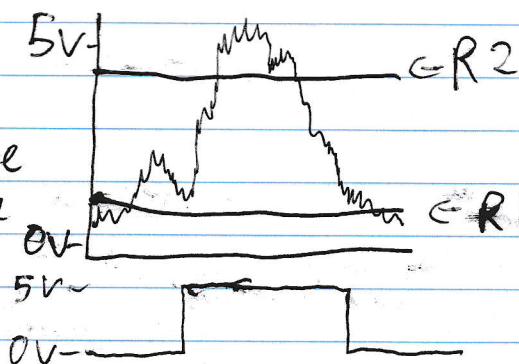
RC Smoothing

the use of the capacitor in this method smoothes out harsh spikes by being charged and discharged the resistor also helps this process



Schmitt trigger

$R1$ and $R2$ resistors are used to set specific values or thresholds to smooth the signal



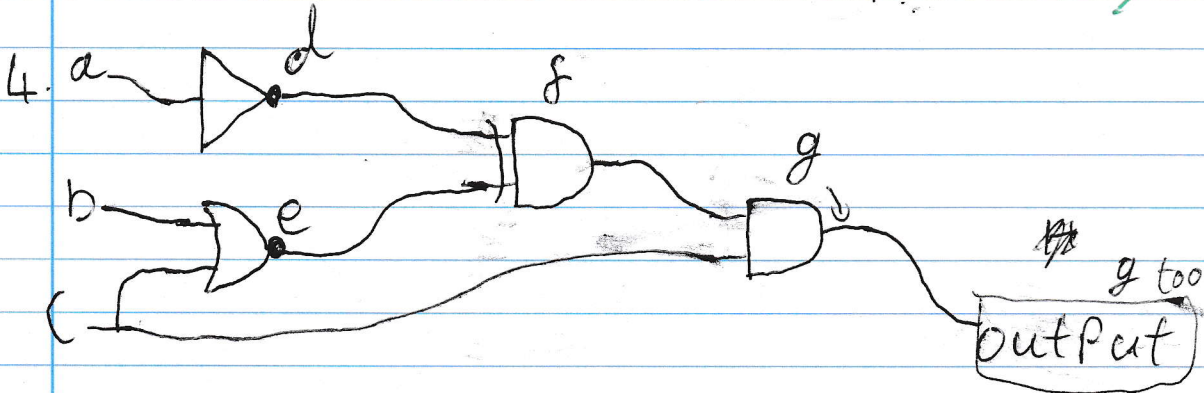
3



a	b	c
0	0	0
0	1	0
1	0	0
1	1	1

✓
✓

3
3

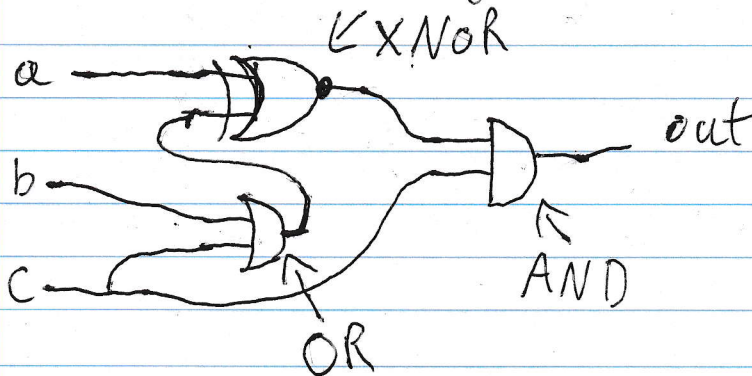


a	b	c	d	e	f	g
0	0	0	1	1	0	0
0	0	1	1	0	1	1
0	1	0	1	0	1	0
1	0	1	0	0	0	0
1	1	0	0	0	0	0
1	0	0	0	1	1	0
0	1	1	1	0	1	1
1	1	1	0	0	0	0

order is confusing
but should still be
true ✓

7
7
✓

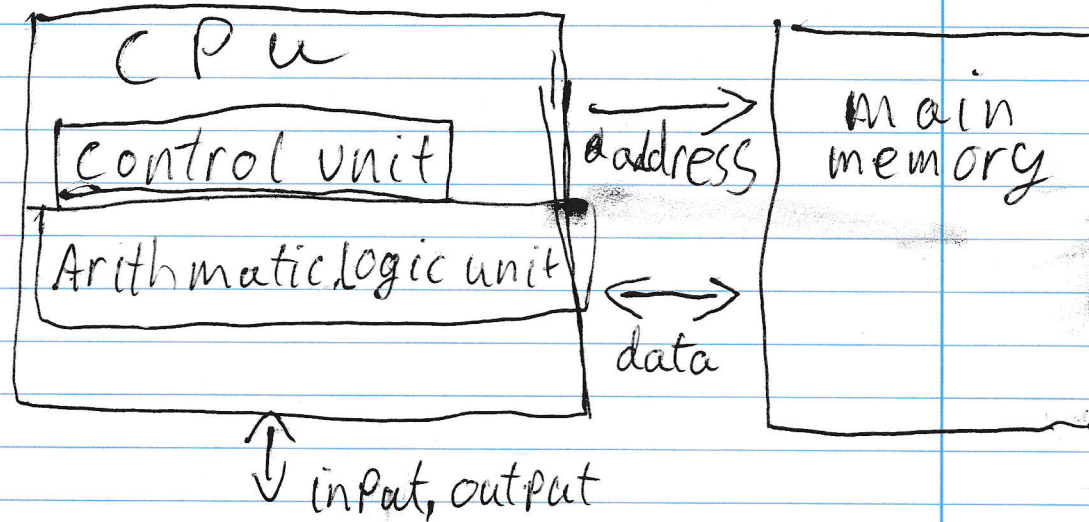
b the use of an xNOR would reduce the ~~the~~ number of nodes - Replace f.



as both were
being slipped
we can flip at
the XNOR gate
instead

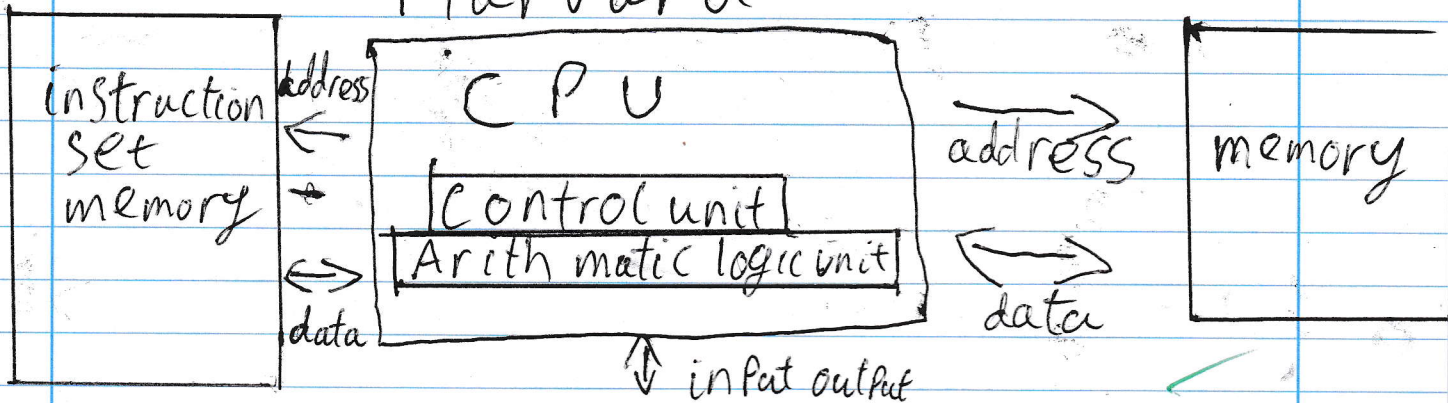
5.

Von Neumann



Von Neumann architecture is simple and allows instructions to be coded as data which is a lot more beginner friendly than Harvard.

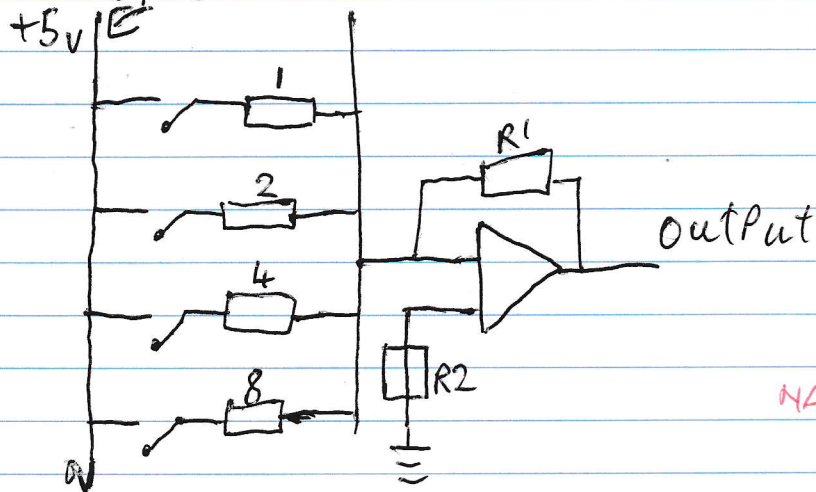
Harvard



The Harvard architecture allows for multiple memory's this allows it to avoid the von Neumann bottleneck which is where operations must be queued. It can also use for example a read only memory set by a manufacturer while still using programmable memory.

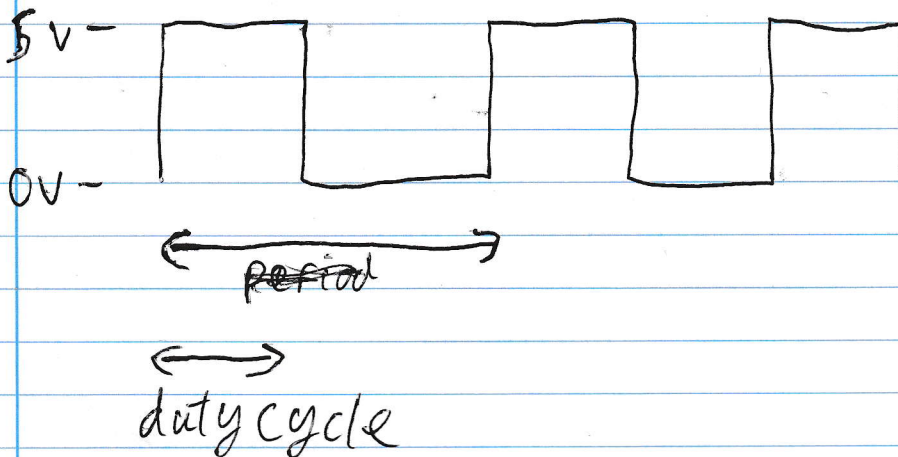
6

micro controller
output



PWM = pulse width modulation

the pin must be able to output a PWM signal



the PWM signal is converted to an analog signal.

based on the duty cycle the voltage out can be from the min 0V to the max 5V (in my example)