

SURNAME: BASIT

FORENAME(S): ZAKIR

12 Pages

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.**

List the numbers of the questions you have attempted	Office Use
1	5 $\frac{1}{2}$
2	1 $\frac{1}{2}$
3	3
4	7
5	3
6	0
	20
Total	40%

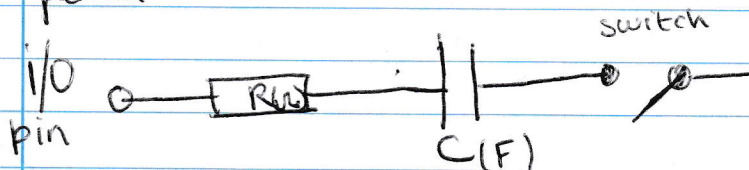
(Gweler yr ochr arall am y fersiwn Cymraeg)

- 1a) returns from subroutine
- 1b) standby - pauses operations
- 1c) adds L to W - L value plus W value
- 1d) bit checks F for f and b
- 1e) decrements F - lowers the F register value by 1

1 1
1 1/2 1 1/2
1 1
2 2
5 1/2

2) Method 1: RC circuit

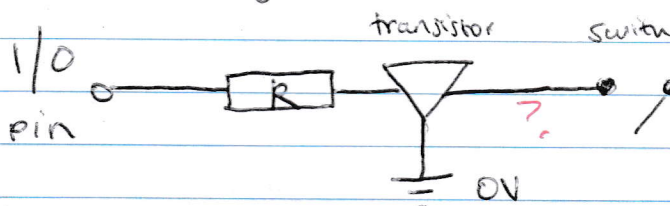
- the circuit consists of a resistor and capacitor in series. the capacitor acts as a buffer which provides a cleaner signal. the circuit allows you to control how long you want it to clean the signal ~~from the~~ because R multiplied by C gives you the time period.



1/2

Method 2: Schmitt trigger

- this uses a transistor which has a high level and low level threshold for the signal. This essentially smooths out the signal.



1 1/2

- 4b) A
- B
- C

A	B	C	output
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

A and B

3) AND $x \Rightarrow D \rightarrow z$

x	y	z
0	0	0
0	1	0
1	0	0
1	1	1

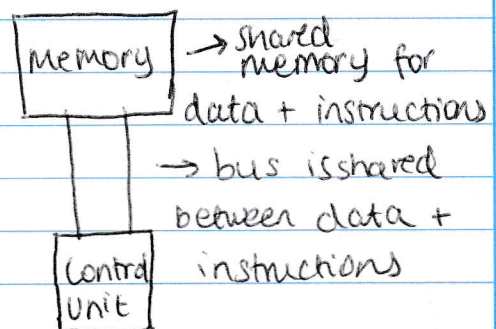
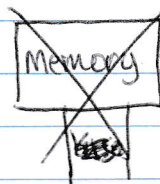
4a)

A	B	C	D NOT A	E B NOR C	F ~~NOT A XOR~~ D XOR E	G F AND C (output)	~~output~~
0	0	0	1	1	0	0	0
0	0	1	1	0	1	1	1
0	1	0	1	0	1	0	0
0	1	1	1	0	1	0	1
1	0	0	0	1	1	0	0
1	0	1	0	0	0	0	0
1	1	0	0	0	0	0	0
1	1	1	0	0	0	0	0

~~4b)~~

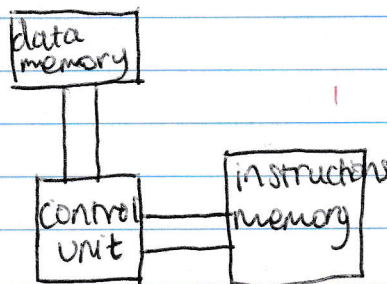
5) Von Neumann $\rightarrow$

+ cheaper to build
since data + instructions
share the same memory and buses,
whereas harvard has separate.

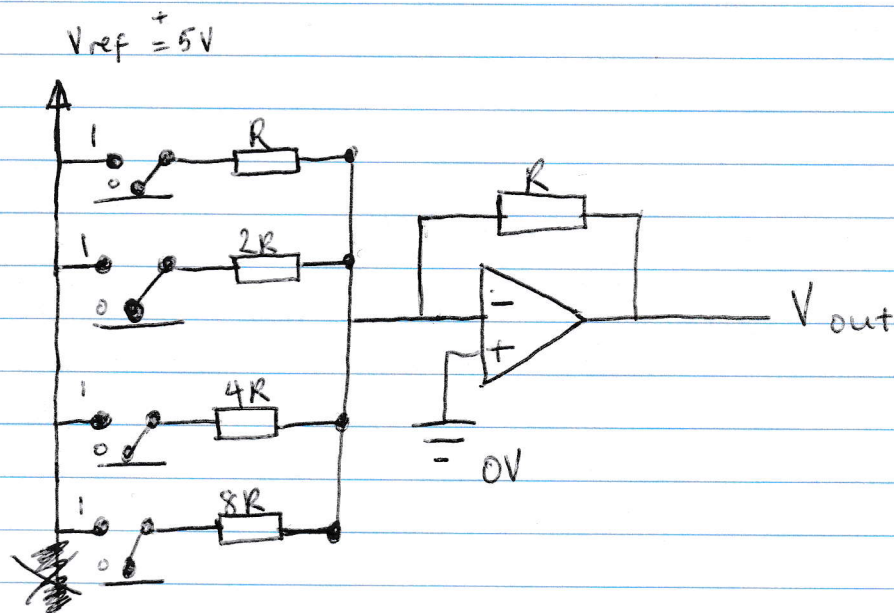


HARVARD ARCHITECTURE

+ Separate buses for the
separate memories result
in more faster + efficient
processing since data and
instructions can be obtained simultaneously



6)



You can implement a 4bit binary weighted DAC that produces a PWM digital signal because the DAC works by using binary switches which are connected to weighted resistor values by the power of 2 in series. $\times$

~~The op-amp in the circuit above will compare the most significant bit will be assigned the smallest current value and the least significant bit will be assigned the largest current value. The op-amp will then complete a 'summing' operation which combines the values to produce the output voltage.~~ $\times$