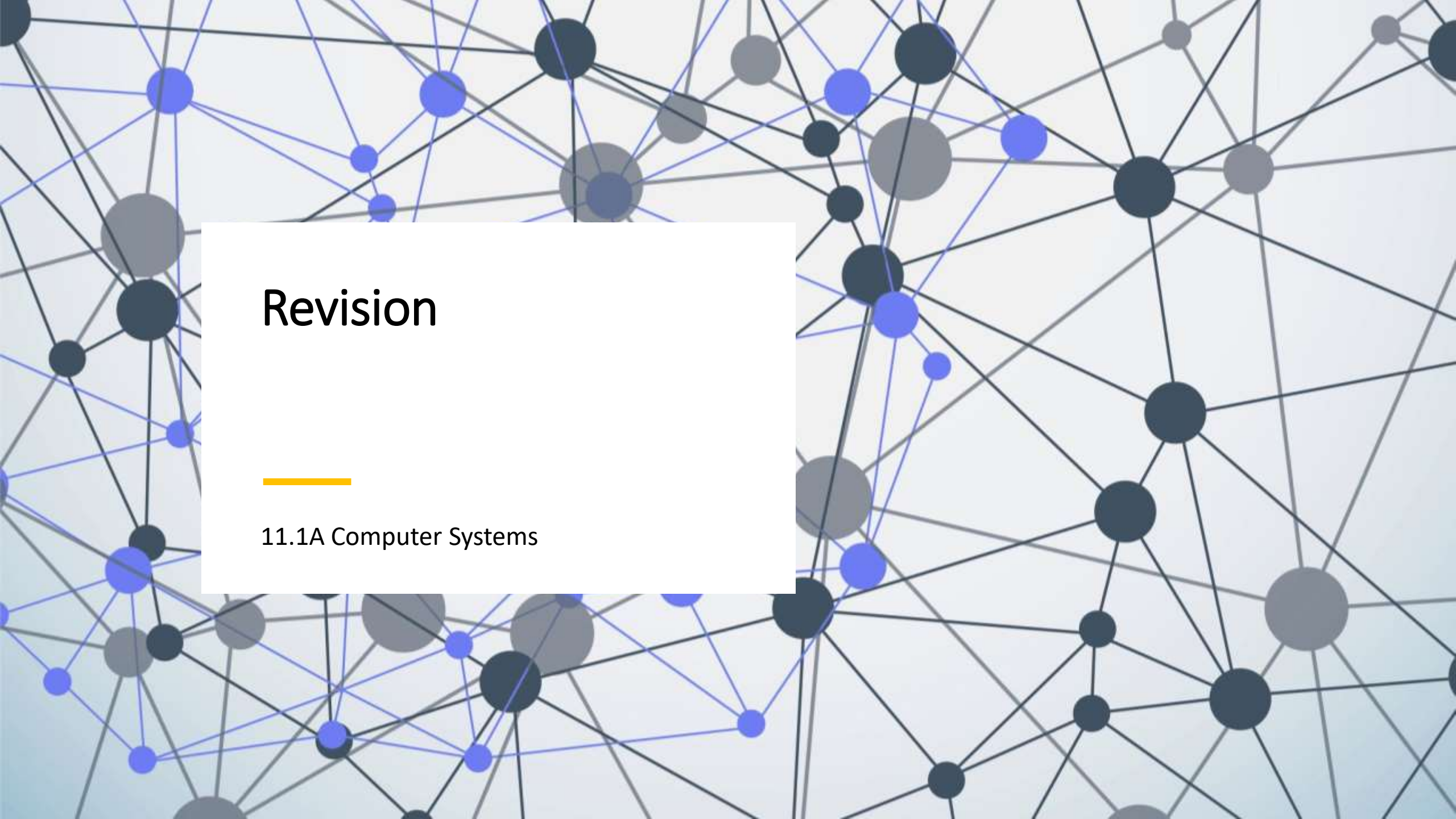


Revision

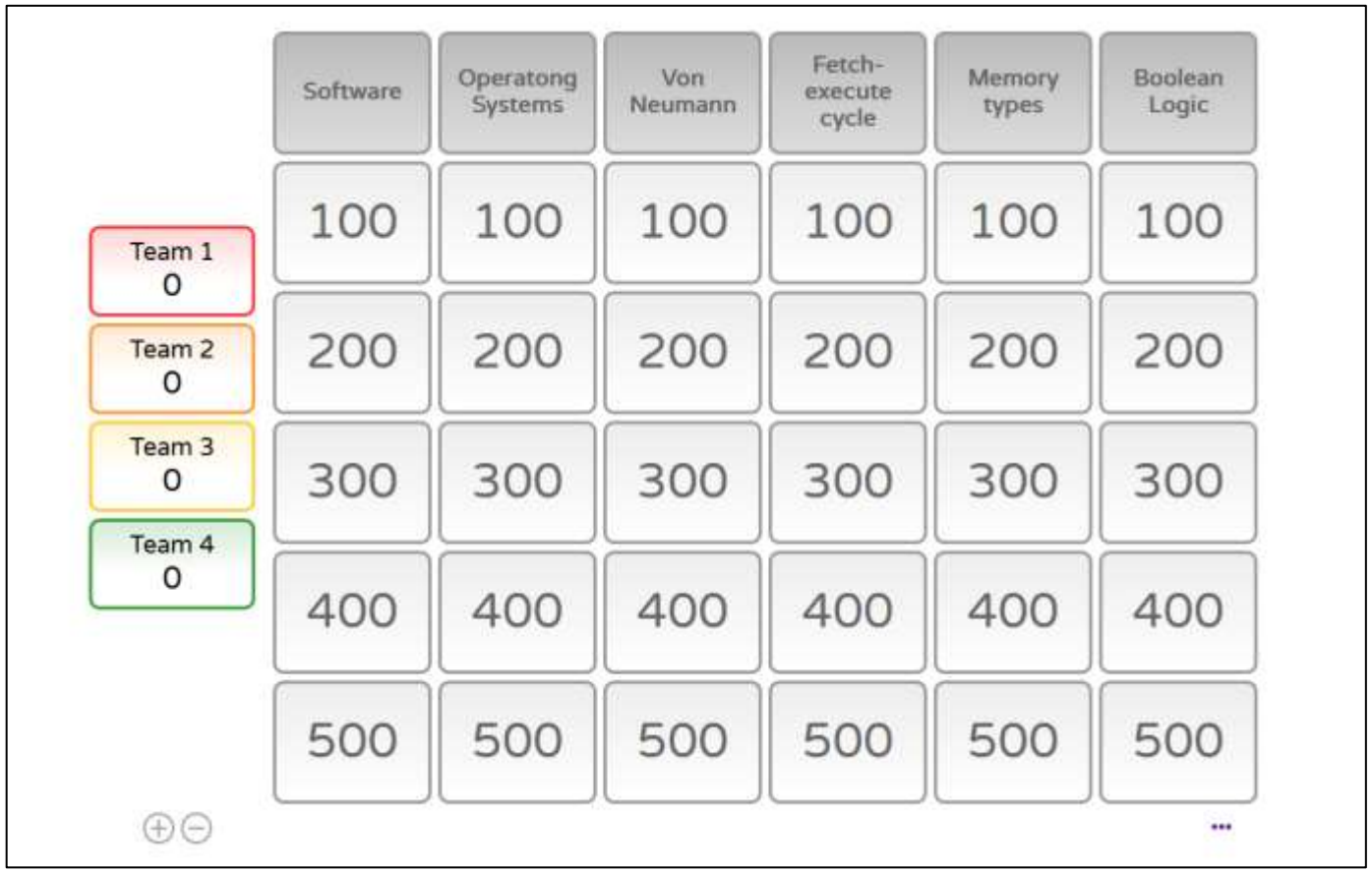
11.1A Computer Systems

Learning objectives

- 11.3.1.1 justify the choice of software and selection criteria for specific purposes
- 11.3.1.2 classify application software
- 11.3.1.3 describe the purpose and basic functions of operating systems
- 11.3.1.4 compare single-user and multi-user operating systems
- 11.3.1.5 compare single-tasking and multitasking operating systems
- 11.3.2.1 describe the interaction of CPU with peripheral devices
- 11.3.2.2 describe the purpose of CPU components, system bus and main memory
- 11.5.1.3 analyze a simple program written in the language of assembly
- 11.3.4.1 explain the differences between RAM and ROM
- 11.3.4.2 explain the purpose of virtual memory
- 11.3.4.3 explain the purpose of cache memory
- 11.3.3.1 distinguish between laws of Boolean logic
- 11.3.3.2 simplify logical expressions using the laws of Boolean logic
- 11.3.3.3 build truth tables AND, OR, NOT, NAND, NOR, XOR

Activity 1. Quiz show.

https://www.flippity.net/qs.php?k=1HFicOKTWm7F6UG33VBD9WvQHcIkBp60yLglpYajd2C0



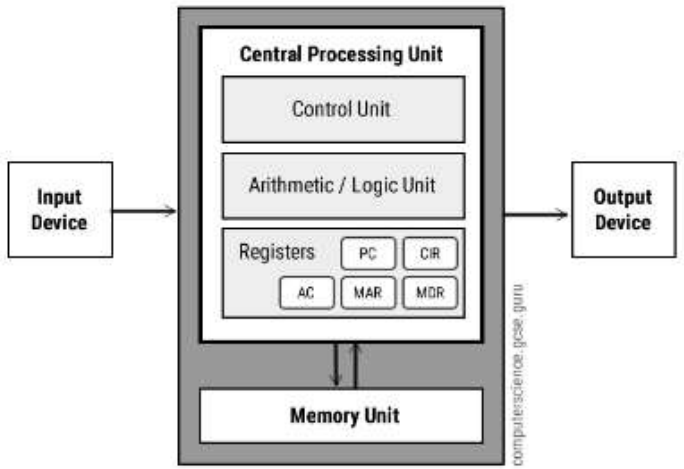
Rules: In teams choose one cell with a certain score. Answer the question within a minute. If you answer correctly, you earn the indicated point. If not, you lose point

Activity 2. Tickets

Select a ticket from the teacher's desk and answer the questions (write on your copybook) on the ticket in 5 minutes. After you answer, return the ticket to the table. Everyone must return the ticket at the same time. We shuffle the tickets again and you select the ticket again. So we repeat this action 3 times.

Answer of final question

Write the names of the parts of the CPU in the correct places [4]

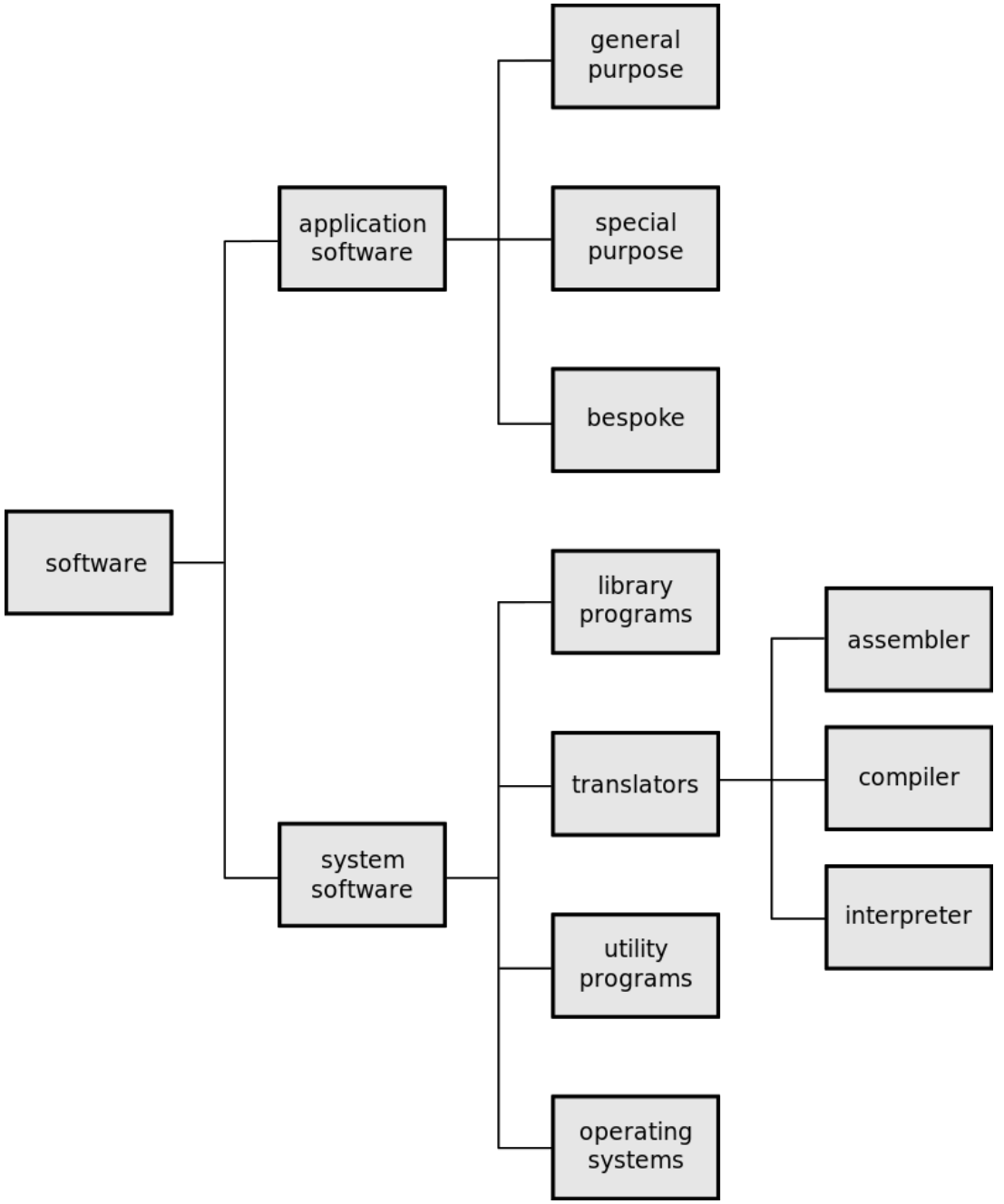


Describe the work process of von Neumann architecture [5]

1. The input device (for example keyboard) sends data to the CPU. The control device receives this data.
2. The control unit sends this data to the main memory to be executed later.
3. When the time comes, the data will be transported from the main memory to the cache (memory registers)
4.Data will be sent to the ALU for processing
5. The control device sends the processed data back (for example, to an output device, such as a monitor.

Additional Tasks
Task 1. Fill in the missing software categories.

Task 2. Write an example for the categories of the application software



Task 3

(a) Below is a list of different software classifications:

1. General purpose application software
2. Utilities
3. Operating systems
4. Translators

Complete each row of the following table with the number from the list above th
represents the most appropriate software classification.

Software	Classification (number)
Virus scanner	
Interpreter	
Spreadsheet	

(b) Another software classification is library programs.

Explain the purpose of library programs.

_____

_____

(1)

(a)

Software	Classification (number)
Virus scanner	2 **A.** utilities
Interpreter	4 **A.** translators
Spreadsheet	1 **A.** general purpose (application software)

1 mark for any two correct rows

2 marks for all 3 correct rows

2

(b) To allow sharing of run-time code across programs;
To save memory as routines are only loaded when needed;
To provide access to procedures/functions/subroutines when writing a program;
To reduce amount of programming required // time taken to write program // allow code to be re-used;

MAX 1

Task 4

An operating system is designed to hide the complexities of the hardware from the user and to manage the hardware and other resources.

Give **three** different types of management of eithe
performed by an operating system.

1. _____

_____

2. _____

_____

3. _____

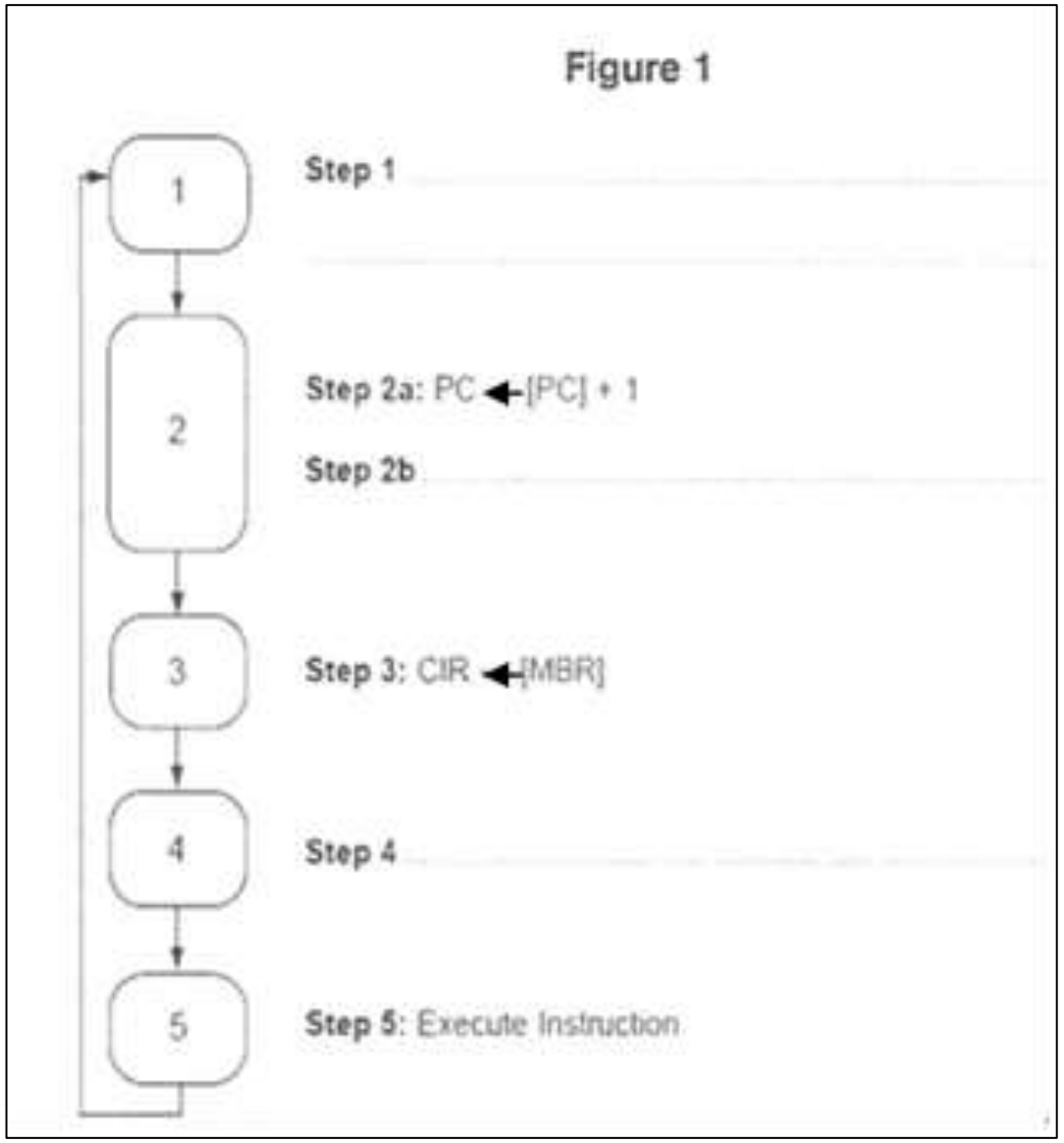
_____

Processor management // Allocation of processors // Allocation of processor time // (process) scheduling // thread management;
A processing management
Allocation/management of RAM / memory // allocation of buffers;
Allocation/management of / control of I/O devices/peripherals // I/O management // device driver management;
File / backing store / secondary store management / access / organisation;
Power / battery management;
A Interrupt handling;
A Provision of Application Program Interface / API;
A interface between hardware and applications;
A Provision / management of (windows in) user interface;
A Management of system security;
A Answers by example, only one example of each type
A A description of a type of software management but not just “software management”. e.g. loading of programs, software installation, registering DLLs.
R Software management alone unless role of OS in this is clear e.g. installation of new software, updating registry

Max 3

Task 5.

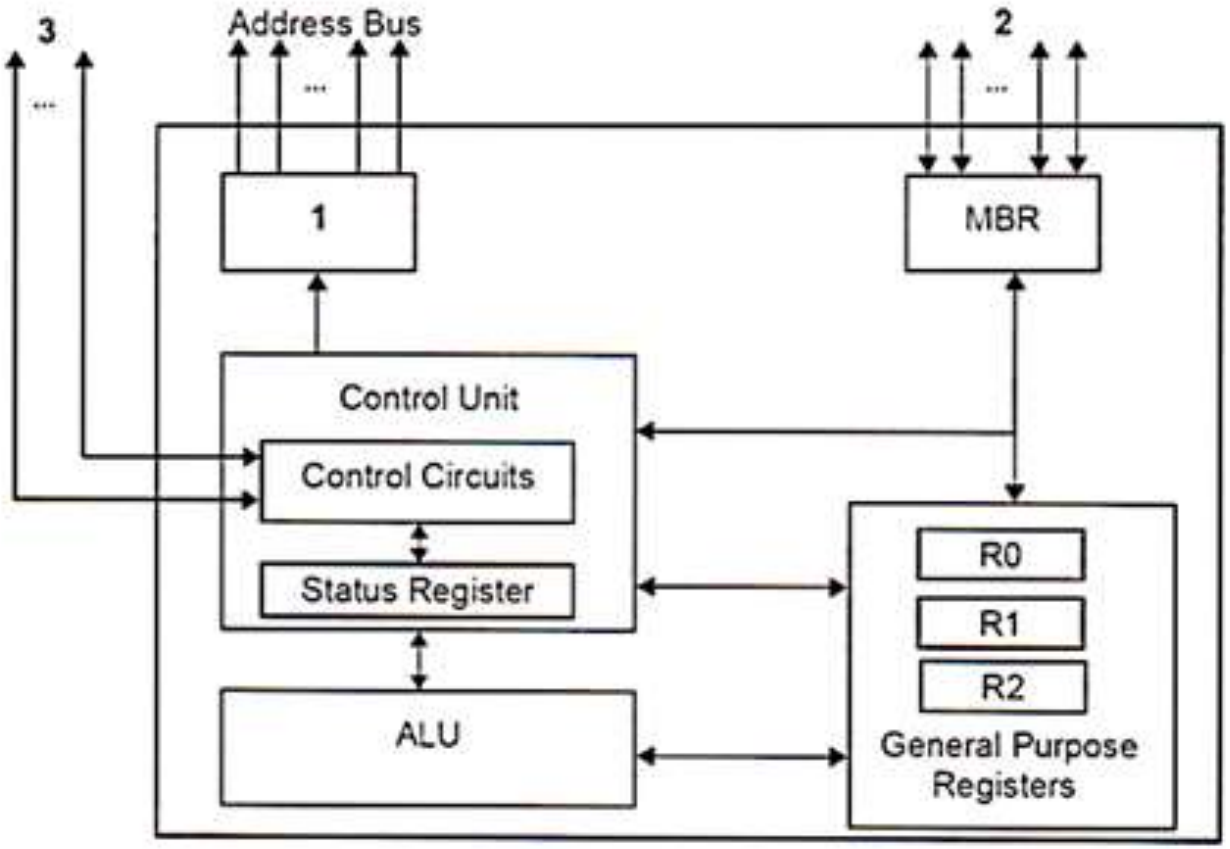
Describe the missing steps 1, 2b and 4 using either register transfer notation or written description. 2 Steps 2a and 2b occur at the same time.



Task 6

Provide full names for the components numbered 1 to 3 in Figure 2 by completing the table below.

Component Number	Component Name
1	MAR
2	Data bus
3	Control bus



Task 7

Write the code

Task 1:

C=num1+ num2;

```
INP
STA 22
INP
STA 23
LDA 22
ADD 23
OUT
HLT
DAT
```

Go to - http://peterhigginson.co.uk/lmc/ - Little man computer

Write the code in Little man

Task 2:

C=num1 - num2;

```
INP
STA 22
INP
STA 23
LDA 22
SUB 23
OUT
HLT
DAT
```

Task 3:

C=(num1 + num2) - num3;

```
INP
STA 22
INP
STA 23
INP
STA 25
LDA 22
ADD 23
SUB 25
OUT
HLT
DAT
```

Task 8

Q1.

Two types of memory inside a computer are RAM and ROM.

(a) Describe what is meant by

(i) RAM,

(2)

M inside a computer.

(2)

RAM inside a computer.

(1)

(3)

(Total 8 marks)

Mark schemes

1.

(a) (i) Random Access Memory

(ii) Read Only Memory

In each case 1 mark for name + 1 for description

4

(b) Bootstrap Program
System Constants

Any 1

1

(c) User Data
Application Software
System Software
System Variables
Buffers
Disk Cache

Any 3

3

[8]

Task 8

Using the ru

You **must** sh

$\overline{\overline{A+0}+C\cdot A}$	[B. NOT B = 0]
$(A+0)\cdot\overline{C\cdot A}$	[Application of De Morgan's Law]
$(A+0)\cdot(\overline{C}+\overline{A})$	[Application of De Morgan's Law]
$A\cdot(\overline{C}+\overline{A})$	[A + 0 = A]
$A\cdot\overline{C}+A\cdot\overline{A}$	[Expand brackets]
$A\cdot\overline{C}+0$	$[A\cdot\overline{A}=0]$
$A\cdot\overline{C}$	[A + 0 = A]

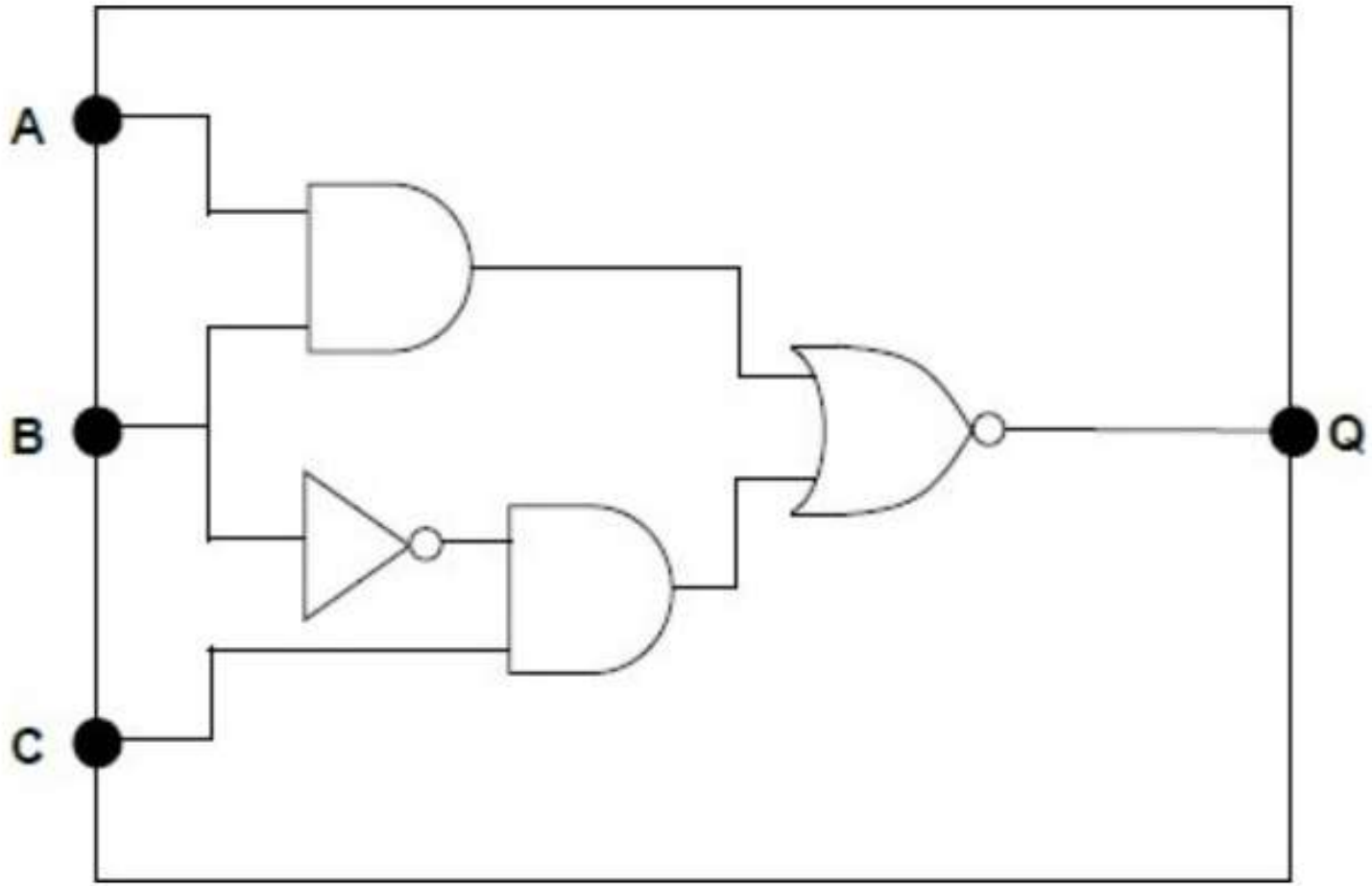
Example working (2)

$(A+B\cdot\overline{B})\cdot\overline{C\cdot A}$	[Application of De Morgan's Law]
$(A+0)\cdot\overline{C\cdot A}$	[B. NOT B = 0]
$A\cdot\overline{C\cdot A}$	[A + 0 = A]
$A\cdot(\overline{C}+\overline{A})$	[Application of De Morgan's Law]
$A\cdot\overline{C}+A\cdot\overline{A}$	[Expand brackets]
$A\cdot\overline{C}+0$	$[A\cdot\overline{A}=0]$
$A\cdot\overline{C}$	[A + 0 = A]

pression.

Task 9

All marks AO2 (apply)



Reflection

- What has been learned
- What remained unclear
- What is necessary to work on