

TERM 1. EXAMS

Computer Systems
CFGS DAW

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TERM 1. EXAMS

1.1 Model 1

Information representation. (3 points).

This exercise must be done on paper. You must be very precise and detail each step for each exercise.

- a Convert to binary code the following values:
 - $253_{(10)}$
 - $F08_{(16)}$
 - $512_{(8)}$

- b Perform the following operations in binary code:
 - $10010011_2 - 01010101_2$ *Check the result by performing the conversion to decimal*
 - $707_{(8)} + 255_{(10)}$

- c Represent de decimal number $-123_{(10)}$ in
 - Sign and magnitude, in an 8-bit word.

- d Represent de decimal number $53,625_{(10)}$ in IEEE754 simple precision.

- e Convert 10GB to MiB

Hardware components. (3 points).

This exercise must be done on paper.

- a Identify the components marked with a number:
- Which is the form factor of this Mobo? Why?
 - Complete name of each component.
 - Main characteristics of each component.
 - What would happen if the components 1 and 4 were damaged?
 - How would you repair each of them?



Operating Systems. (2,5 points).

This exercise must be done on paper.

Simulate how the SRTF algorithm will attend these processes:

Process	Arriving time	CPU Usage
<i>P1</i>	0	7
<i>P2</i>	1	4
<i>P3</i>	2	2
<i>P4</i>	5	3

If two or more processes compete for the CPU, you must decide, in a reasoned way, which process will use the CPU.

- a Draw the CPU usage in a diagram (as shown in the class notes). You can use different colors except the red one.
- b At the end you must calculate:
 - Waiting time for each process and the mean waiting time.
 - Return time for each process and the mean return time.

Functional elements of a computer or Windows administration.Choose one. *(1,5 points)***Functional elements of a computer.***This exercise must be done on paper.*

Code	Instrucction	Description
LOAD RX,RY	0000rxry	Loads content of Register ry in Register rx
STORE MMMM,RX	01rxmmmm	Stores content of Register rx in memory mmmm
ADDi RX,RY,RZ	10rxryrz	Performs $ry+rz$ and sends the result to the register rx

Memory Address	Content	Register	Content
0000		R1	0000
0001		R2	0000
0010		R3	0010
0011		R4	1010

For each instruction, detail the operation performed by the CPU.

Also, you must specify when the registers MDR and/or MAR are used and their content.

Memory address is in hexadecimal.

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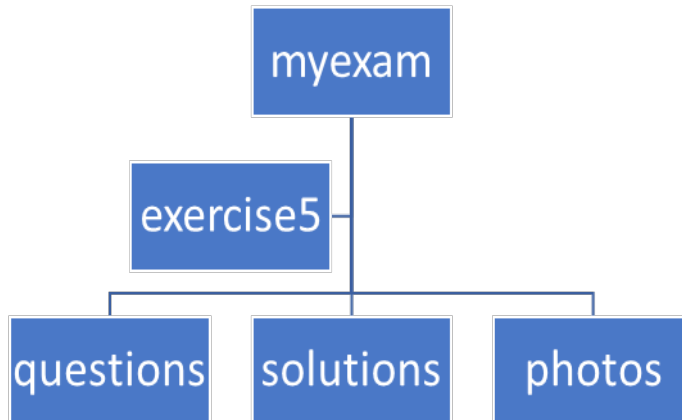
i1: LOAD R1, R3
i2: LOAD R2, R4
i3: ADDi R1,R1,R2
i4: STORE #3, R1

```

Windows administration.

This exercise must be done on paper.

- a Using batch commands, create this folder structure.
- Suppose that the main folder (myexam) is in C:\.
 - You must create all the folders from C:\.



- b Move to *exercise5* folder and create a text file called *question1.txt* with the content “my text file in exercise 5” and show its content.
- c From *exercise5* folder copy the file *question1.txt* to the folder *solutions*. And rename it to *solution1.txt*
- d Move to *solutions* folder and add read-only attribute (R) to the file *solution1.txt*.

1.2 Model 2

Information representation (2,5 points)

This exercise must be done on paper.

You must be very precise and detail each step for each exercise.

a Perform the following conversions:

- $1001_{(8)}$ to binary representation
- $110110_{(2)}$ to decimal representation
- $72_{(2)}$ to decimal representation

b Represent the number $-35_{(10)}$ in:

- 2's Complement
- Excess K with $K=2^{n-1}$

c Perform these binary operations:

$$110111 \text{ / } 101$$

$$100001 - 010010$$

d Convert 10 Mb to MiB

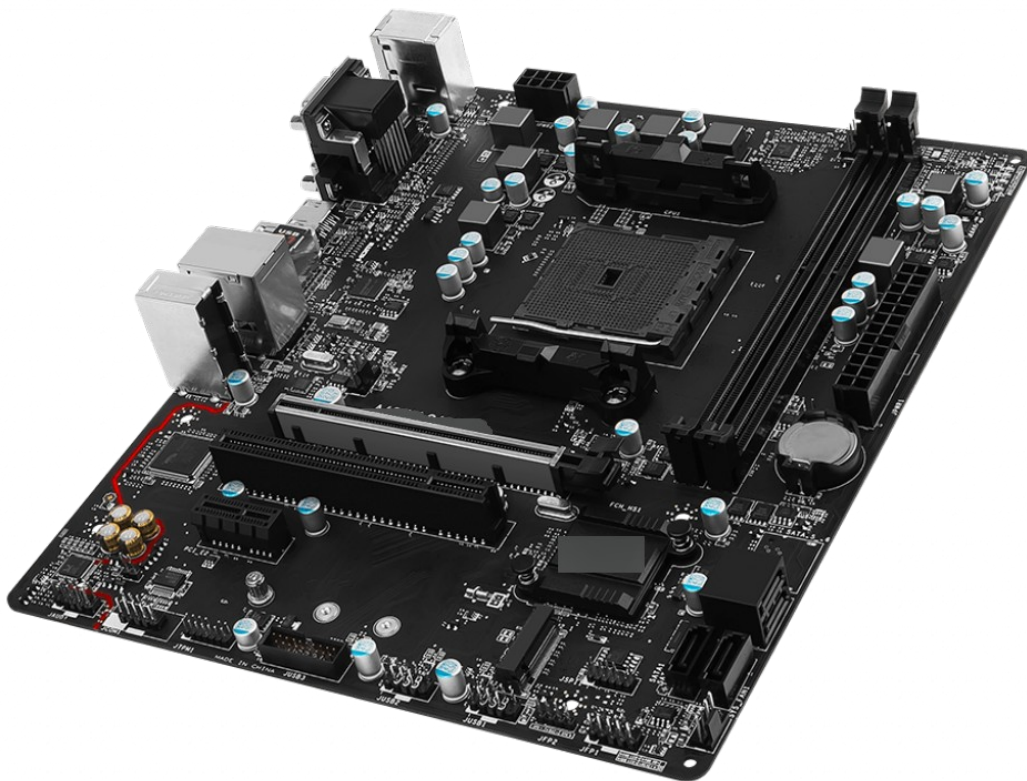
Hardware Components (3 points)

This exercise must be done on paper.

If you do not see well the image, you can right-click on it and save it to you computer and open it with an image viewer.

Identify the minimum components that should be connected to this Mobo so that it would work as a workstation.

- a Which is the form factor of this Mobo?
- b What do you think this Mobo is used for? *Respond in a reasoned way.*
- c Describe the devices that should be connected/inserted in this Mobo to make it work efficiently. *For each device, briefly explain its function in the computer system and its main characteristics.*



Operating Systems (2,5 points)

This exercise must be done on paper.

Using FCFS algorithm for CPU, Disc1 and Disc2, draw how both processes (P1, P2) compete for the resources.

In case two or more processes compete for a resource at the same time, you must decide (in a reasoned way) which process will go first.

Each process has a table showing the order of the resources that it will need.

Process	Arriving Time	P1	P2	Time	Queue in CPU	Process in CPU	Queue Disc1	Disc1	Queue Disc2	Disc2
P1	0	CPU	CPU	0						
P2	0	Disc1	Disc2	1						
		CPU	CPU	2						
<u>FCFS ALL QUEUES</u>		Disc1	CPU	3						
		CPU	Disc2	4						
		Disc	CPU	5						
		Disc2	Disc1	6						
		CPU	Disc1	7						
		CPU	CPU	8						
				9						
				10						
				11						
				12						

At the end you must calculate:

- CPU Waiting/Queue time for each process and its mean waiting time.
- Return time for each process and the mean return time.
- CPU Usage

Choose one.

Functional elements of a computer.(2 points)

This exercise must be done on paper.

<u>Code</u>	<u>Instruction</u>	<u>Description</u>
LOAD <u>RX</u> , <u>RY</u>	0000rxry	Loads content of Register <u>ry</u> in Register <u>rx</u>
STORE <u>MMMM</u> , <u>RX</u>	01rxmmmm	Stores content of Register <u>rx</u> in memory <u>mmmm</u>
ADDi <u>RX</u> , <u>RY</u> , <u>RZ</u>	10rxryrz	<u>ry+rz</u> and sends the result to the register <u>rx</u>

The machine instructions are:

- i1: 00000001
- i2: 01011111
- i3: 00000010
- i4: 10000110

You must:

- a Convert each machine instruction to its associated code. *Detail the process.*
- b Decode the instruction i2 and **detail** the components of the CPU that are involved to execute it.

Windows administration. (2 points)

This exercise must be done on paper.

In Windows 10 there is a shared folder *classNotes*.

Also, there are two user groups:

- *gStudents*: users in this group can access the folder *classNotes*, read the contents of the folder, create files in it, but they cannot modify or delete files and they cannot create subfolders.
- *gTeachers*: users in this group can access the folder *classNotes*, do any update on the files inside the folder and create subfolder, but they cannot delete anything.

Concerning the folder *classNotes*:

- a Which individual and/or special permissions have each user group? *Justify each permission.*
- b What would happen if a user in *gStudents* executes the command *md questions* from console?
- c What would happen if a user in *gTeachers* executes the command *attrib +r lesson1.txt* from console? (suppose the file exists in the folder *classNotes*).