Name: _____ Student ID: _____ Date: _____
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Worksheet #2
Computer Architecture and System

Objectives

- To understand the architecture and operation of computer system
- To study the basic components of computer hardware
- To study the operation and programming language of MU0 machine

1. What is a stored program computer? Explain.

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_____
_____
_____
_____

2. What is the difference between MCU, MPU and CPU?

_____
_____
_____
_____
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_____

3. What roles does a register play in a processing unit?

_____
_____
_____
_____
_____
_____
_____

4. What is the memory address in computer system? What is it used for?

_____
_____
_____
_____
_____

5. What is the difference between assembly language and machine language?

_____
_____
_____
_____

6. Convert the following mnemonic code to machine code (**hex** format).

Mnemonic Code	Machine code
LDA 5A	
ADD 5C	
ADD 5E	
SUB 60	
JGE 10E	
STO 60	
STP	

7. Convert the following mnemonic code to machine code (opcode and operand in **binary** format).

Mnemonic Code	Machine code	
	Opcode	Operand
LDA 6F		
ADD AB		
JNE 10		
JMP 25		
SUB 30		
STO 80		
STP		

8. Convert the following machine code back to mnemonic code.

Machine code	Mnemonic Code
0x002C	
0x202E	
0x4300	
0x6108	
0x12EE	
0x3030	
0x7000	

9. Convert the following machine code (opcode and operand format) back to mnemonic code.

Machine code		Mnemonic Code
Opcode	Operand	
0000	0000 0101 0111	
0001	0101 0111 0001	
0110	0100 0001 0010	
0100	0000 0010 0000	
0011	0000 0011 0101	
0010	1000 0100 0010	
0101	0001 0001 0000	
0111	0000 0000 0000	

10. Write a program in mnemonic code and its machine code for processor MU0 to calculate A + ((B + C) - D) where the value of

- A stores at address 100
- B stored at address 102
- C stored at address 104
- D stored at address 106

The result will be store at address 2AE.

Mnemonic Code	Machine Code (hex format)
……	……
……	……
……	……
……	……
……	……
……	……
……	……

11. Given memory address

- 100 stores data 00AB
- 102 stores data 000B
- 104 stores data 000C
- 106 stores data 000C

After executing the following program

```
LDA  100
ADD  102
SUB  104
ADD  106
STO  108
STP
```

What is the data inside register :

IR = ……
ACC = ……
PC = ……

What is the data inside Memory Address :

0x000 = ……..……
0x002 = ……..……
0x004 = ……..
0x006 = ……..
0x008 = ……..
0x010 = ……..
0x108 = ….……..

12. Given memory address

- 100 stores data 0015
- 102 stores data 000A
- 104 stores data 0010

After executing the following program

```
LDA  100
ADD  102
JNE  8
ADD  104
STO  106
STP
```

What is the data inside memory address 106 ……..

13. Given memory address

- 100 stores data 0ABF
- 102 stores data 0A18
- 104 stores data 0B56
- 106 stores data 00FD

After executing the following program

```
LDA  100
JMP  6
ADD  102
JGE  C
SUB  104
ADD  106
STO  108
STP
```

What is the data inside memory address 108 …….