Problem 1

1) What are the phases of program design?
2) State the difference between:
   a. The main memory and the secondary memory
   b. The functions of the compiler and the linker
   c. Random and sequential access memory
3) What is the purpose of the operating system? Give three examples of popular operating systems.

Answer in Page 3 & 4

Problem 2

The following numbers are represented in the base 10 number system. Perform the following arithmetic operations using unsigned fixed-point binary format and **show your work**:

$(36)_{10}$

- Add $(24)_{10}$ to $(12)_{10}$ 100100
- Add $(32)_{10}$ to $(76)_{10}$ 1101100

$(108)_{10}$

Steps In page 4

Problem 3

Do the following operations using unsigned fixed-point binary arithmetic. Then check your work by converting all the numbers to base 10 and **show your work**:

```
 10101011
+ 10100111
--------------------
 101010010
```

```
 1111100010
+ 1011011101
-------------------------
 11010011111
```

10101011
10100111
101010010

11111100010
1011011101
11010111111

Problem 4

Convert the following to the base indicated:

$2 \quad 76$

$(10110)_2$ = (26)$_8$
$(1010000101101101)_2$ = (1416D)$_{16}$
$(24)_{10}$ = (30)$_8$
$(37)_{10}$ = (100101)$_2$

37/2	18	1
18/2	9	0
9/2	4	1

4/2	2	0
2/2	1	0
1/2		1

	Quotient	rem
24/8	3	0
3/8	0	3

101 010

(52)8	=	(101010)$_2$	
(56)8	=	(2E)$_{16}$	
(2B)16	=	(53)$_8$	
(EF)16	=	(239)$_{10}$	

Answers!

Problem(1):

1. There are 2 phases in the program design process:
   - Problem Solving phase.
   - Implementation phase.

2. State the difference.

a) Main Memory Stores instructions and data when a program is running while the Secondary Memory Stores data and Instructions between Sessions.

B) Compilers Translate high-Level Languages to machine Language for the Computer to understand. While Linkers Combine the object code for the programs and pre-Compiled routines into the Machine Language program the CPU can run

C) Random Access Memory (RAM) Can directly Access any Memory location. However, Sequential requires Searching through other items first to aquire Data.

3) Operating System (OS) allows users to communicate with the computer (It is also responsible for responding to user requests to run other programs).

Types ~~g OS~~

Windows, Linux, and Macintosh.

Problem 2

	Q.	rem
36/2	18	0
18/2	9	0
9/2	4	1
4/2	2	0
2/2	1	0
1/2		1

100100

	Quo.	Rem
108/2	54	0
54/2	27	0
27/2	13	1
13/2	6	1
6/2	3	0
3/2	1	1
1/2		1

1101100