**COLLEGE OF COMPUTING AND INFORMATICS**

**Assignment 2**

**Course Title: Computer Organization Course Code : IT 110**

**Marks: 4**

***Deadline: 1/3/2016***

**1.** For LMC, write assembly code to add two numbers and then subtract a third number (the subtraction answer should be positive)

**[2 marks]**

**Mailbox Mnemonic Instruction Description**

00 IN input 1st Number

01 STO 98 store data

02 IN input 2nd Number

03 ADD 98 add 1st # to 2nd #

04 STO 98 store data

05 IN input 3rd Number

06 STO 99 store data

07 SUB 98 sub the sum from the 3rd Number

08 BRP 11 test

09 LDA 98 if negative, reverse order

10 SUB 99 sub the 3rd num from the sum

11 OUT print the result

12 COB stop

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98 DAT 00 data

99 DAT 00 data

**2.** Define the terms assembler and compiler in one line**. [1 Mark]**

Compiler translates high level language into machine code.

Assembler converts or translates assembly language into machine code.

**3.** Briefly explain the four generations of programming languages?  **[1 Mark]**

Generation 1: Programmed directly in binary using wires or switches

Generation 2: Assembly language was introduced in this generation, human readable, converted directly to machine code

Generation 3: High level languages, while loops, if-then-else, structured. Most programming today including object oriented languages

Generation 4: in this generation natural languages, non-procedural , report generation was introduced and used programs to generate other programs.