**Ahsanullah University of Science and Technology**

**CSE 3109 Digital System Design Quiz 3 22-07-17 Marks 20**

1. Write a program for SAP-1 to solve this arithmetic problem. **6**

100 + 89 + 11 – 150

The numbers are in decimal form.

1. Translate the following program into SAP-I machine language. **4**

|  |  |
| --- | --- |
| Address | Instruction |
| 0H | LDA 9H |
| 1H | ADD AH |
| 2H | ADD BH |
| 3H | SUB CH |
| 4H | OUT |
| 5H | HLT |

1. The register configuration and flow chart of a digital system that multiplies two unsigned binary numbers by repeated addition method is shown in fig 1.
2. Let A = 0100 and B = 0011. Going through the steps in the flowchart, show that the system returns to the initial state, with register P having the product 1100. **4**
3. Draw a state diagram for the control and list the register transfers to be executed in each control state. **6**

**Figure 1 :** Multiplication by successive addition.

P 0 00

A

Control

Logic

**B**

**P**

P P+B

A A-1

Initial state

x = 1

**A**

qm =1 Multiplicand Multiplier

qm

Product x

= 0

≠ 0

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**CSE 3109 Digital System Design Quiz 3 22-07-17 Marks 20**

1. Write a program for SAP-1 to solve this arithmetic problem. **6**

55 + 67 + 11 – 111

The numbers are in decimal form.

1. Translate the following program into SAP-I machine language. **4**

|  |  |
| --- | --- |
| Address | Instruction |
| 0H | LDA 7H |
| 1H | SUB FH |
| 2H | ADD EH |
| 3H | ADD AH |
| 4H | OUT |
| 5H | HLT |

|  |
| --- |
| **Figure 1:** control state diagram for problem **2**  x = 0  x = 1  x = 0 x = 0  y = 1 y = 0  x = 1, y = 0  x = 1 x = 1  y = 1 y = 0  x = 1, y = 1 |
| The state diagram of a control unit is shown in **Figure 1**. It has four states and two inputs x and y.   1. Design the control using four D flip-flops. **3** 2. Design the control using two J-K flip-flops and a 2×4 decoder. **7** |
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