**1. Program to Add Two 8-Bit Numbers**

***Statement:*** *Add numbers 22H & 33H and store the result in 2050H.*

**Program**

MVI A, 22H ; Move 22H to Accumulator

MVI B, 33H ; Move 33H to B register

ADD B ; Add B to A (A = A + B)

STA 2050H ; Store result in memory address 2050H

HLT ; Terminate program

**Program Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Starting Address | Instructions | Opcode | Description |
| 2000  2001 | MVI A, 22H | 3E  22 | Move 22H to Accumulator |
| 2002  2003 | MVI B, 33H | 06  33 | Move 33H to B register |
| 2004 | ADD B | 80 | A = A + B |
| 2005  2006  2007 | STA 2050H | 32  50  20 | Store result in memory address 2050H |
| 2008 | HLT | 76 | Terminate program |

**Input:**

|  |  |
| --- | --- |
| **A** | **B** |
| **22H** | **33H** |

**Output:**

|  |
| --- |
| **2050H** |
| **55H** |

**2. Program to Add Two 8-Bit Numbers from Memory**

***Statement***: *Add numbers from memory location 2050H & 2051H and store the result in memory location 2055H.*

**Program**

LDA 2050H ; Load A with the contents of memory location 2050H

MOV B, A ; Copy contents of A to B register

LDA 2051H ; Load A with the contents of memory location 2051H

ADD B ; Add B to A (A = A + B)

STA 2055H ; Store result in memory address 2055H

HLT ; Terminate program

**Program Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Starting Address | Instructions | Opcode | Description |
| 2000  2001  2002 | LDA 2050H | 3A  50  20 | Load A with contents from 2050H |
| 2003 | MOV B, A | 47 | Copy contents of A to B |
| 2004  2005  2006 | LDA 2051H | 3A  51  20 | Load A with contents from 2051H |
| 2007 | ADD B | 8 | Add B to A |
| 2008  2009  200A | STA 2055H | 32  55  20 | Store result in memory address 2055H |
| 200B | HLT | 76 | Terminate program |

**Input:**

|  |  |
| --- | --- |
| **Memory** | **Value** |
| **2050H** | **22H** |
| **2051H** | **33H** |

**Output:**

|  |
| --- |
| **2050H** |
| **55H** |

**3. Program to Subtract Two 8-Bit Numbers**

***Statement:*** *Subtract numbers from memory location 2050H & 2051H and store the result in memory location 2055H.*

**Program**

LDA 2050H ; Load A with the contents of memory location 2050H

MOV B, A ; Copy contents of A to B register

LDA 2051H ; Load A with the contents of memory location 2051H

SUB B ; Subtract B from A (A = A - B)

STA 2055H ; Store result in memory address 2055H

HLT ; Terminate program

**Program Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Starting Address | Instructions | Opcode | Description |
| 2000  2001  2002 | LDA 2050H | 3A  50  20 | Load A with contents from 2050H |
| 2003 | MOV B, A | 47 | Copy contents of A to B |
| 2004  2005  2006 | LDA 2051H | 3A  51  20 | Load A with contents from 2051H |
| 2008  2009  200A | STA 2055H | 32  55  20 | Store result in memory address 2055H |
| 200B | HLT | 76 | Terminate program |

**Input:**

|  |  |
| --- | --- |
| **Memory** | **Value** |
| **2050H** | **33H** |
| **2051H** | **22H** |

**Output:**

|  |
| --- |
| **2050H** |
| **11H** |

**4. Program to Find 2’s Complement of a Number.**

**Statement:** *Input number from memory location 2013H and store result in memory location 2052H.*

**Program**

LDA 2013H ; Load A with the contents of memory location 2013H

CMA ; Complement A

INR A ; Increment A by 1

STA 2052H ; Store result in memory address 2052H

HLT ; Terminate program

**Program Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Starting Address | Instructions | Opcode | Description |
| 2000  2001  2002 | LDA 2013H | 3A | Load A with contents from 2013H |
| 2003 | CMA | 2F | Complement A |
| 2004 | INR A | 3C | Increment A by 1 |
| 2005  2006  2007 | STA 2052H | 32  52  20 | Increment A by 1 |
| 2008 | HLT | 76 | Terminate program |

**Input:**

|  |  |
| --- | --- |
| **Memory** | **Value** |
| **2013H** | **22H** |

**Output:**

|  |
| --- |
| **2052H** |
| **DEH** |

**5. Program to Right Shift 8-Bit Numbers**

***Statement:*** *Shift an eight-bit data four bits right. Assume data is in memory location 2051H. Store result in memory location 2055H.*

**Program**

LDA 2051H ; Load A with the contents of memory location 2051H

RRC ; Rotate accumulator right

RRC ; Rotate accumulator right

RRC ; Rotate accumulator right

RRC ; Rotate accumulator right

STA 2055H ; Store result in memory address 2055H

HLT ; Terminate program

**Program Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Starting Address | Instructions | Opcode | Description |
| 2000  2001  2002 | LDA 2051H | 3A  51  20 | Load A with contents from 2051H |
| 2003 | RRC | 0F | Rotate right |
| 2004 | RRC | 0F | Rotate right |
| 2005 | RRC | 0F | Rotate right |
| 2006 | RRC | 0F | Rotate right |
| 2007  2008  2009 | STA 2055H | 32  55  20 | Store result in memory address 2055H |
| 200A | HLT | 76 |  |

**Input:**

|  |  |
| --- | --- |
| **Location** | **Data** |
| **2051H** | **F0H** |

**Output:**

|  |  |
| --- | --- |
| **Location** | **Data** |
| **2055H** | **0FH** |