**Assignment No.2**

**Title:** Code Conversion (HEX to BCD and BCD to HEX Conversion)

**Aim:** Write ALP to convert 4-digit Hex number into its equivalent BCD number

and 5-digit BCD number into its equivalent HEX number. Make your program

user friendly to accept the choice from user for

1) HEX to BCD 2) BCD to HEX 3) EXIT.

Display proper strings to prompt the user while accepting the input and displaying

the result.

**Objective:** Implementation of conversion process of different numbering system.

**Theory:**

**Directives used:**

1. . model 🡪 Initializes memory model before defining any segment. It can be

tiny, small, medium, compact, large. Programmer can choose the memory

model based on the requirement.

1. .data 🡪 start of data segment
2. . code🡪 start of code segment
3. DB (Define Byte)🡪 allocates and initializes bytes of storage
4. End🡪End of the program module.

**Instructions used:**

1. Mov: destination, source

Move the contents of source register into destination register.

1. Lea: load effective address into dx register.
2. Inc: increments contents of specified register.
3. Dec: decrement contents of specified register.
4. Jnz: Jump if not zero to specified label.
5. Rol: rotate 4 times the contents of dx register.
6. Cmp: compare contents of specified register.
7. Jbe: jump before exit to specified label.
8. And: logically ands the contents of specified register with the specified value.
9. Add: Add contents of source and destination and put the result in destination.
10. Sub: Subtract contents of source and destination and put the result in destination.
11. Mul: Multiply the contents of specified register with contents of accumulator i.e. ax and store result in ax.
12. Div: Divide the contents of specified register by contents of accumulator i.e. ax and store result in ax.

**Interrupts used:**

1. INT 21H, Function 4CH🡪 terminate the code properly and return to the DOS Prompt.
2. INT 21H, Function 02H 🡪Display a number or character on the screen.
3. INT 21H, Function 09H🡪 Display the string on the screen

**Main Algorithm:**

1. start
2. select any option from the given MENU
3. select 1 to perform BCD to HEX conversion
4. Select 2 to perform HEX to BCD conversion
5. Select 3 to exit from the given MENU
6. stop

# I. HEX to BCD

**Input:** 4 digit HEX number

**Output:** 5 digit BCD number

**Macros:** Not used

**Procedure**:

1. Name: htb

2. Purpose: To convert a HEX to a BCD number

3. I/P: 4 digit HEX number - ABCD

4. O/P: 5 digit BCD number - 43981

5. Algorithm for Procedure

1. Start

2. Accept msd of number.

3. Accept 2nd digit of number

4. Accept 3rd digit of number

5. Accept lsd of number

6. Display message on screen that equivalent 5 digit bcd is

7. Divide number by 10000

8. Display the msd on screen i.e. remainder

9. Divide number by 1000

10. Display the 2nd digit on screen i.e. remainder

11. Divide number by 100

12. Display the 3rd digit on screen i.e. remainder

13. Divide number by 10

14. Display the 4th digit on screen i.e. remainder

15. Display the lsd on screen i.e. remainder

16. Stop

**II. BCD to HEX**

**Input:** 5 digit BCD number

**Output:** 4 digit HEX number

**Macro:** Not used.

**Procedure**:

1. Name: bth

2. Purpose: To convert a BCD to a HEX number.

3. I/P: 5 digit BCD number - 12345

4. O/P: 4 digit HEX number – 3039

5. Algorithm for Procedure:

1. start

2. Clear result location.

3. Accept 1st digit and multiply with 10000

4. Accept 2nd digit and multiply with 1000

5. Accept 3rd digit and multiply with 100

6. Accept 4th digit and multiply with 10

7. Accept 5th digit

8. Display message on screen that the equivalent hex digit is

9. Display 1st digit

10. Display 2nd digit

11. Display 3rd digit

12. Display 4th digit

13. Stop

**III. Exit**

**Procedure:**

1. Name: Exit
2. Purpose: Terminate program & transfer control to os.
3. Algorithm for procedure
4. Start
5. Terminate program and transfer control to os.
6. Stop

**Calculations:** Not applicable

**Conclusion:** Thus, we have converted a 5 digit BCD to a 4 digit HEX number and a 4 digit HEX to a 5 digit BCD

**Platform Used:** Windows XP, Turbo Assembler.