

Assignment - 9

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Title :- Factorial

Problem definition :-

Write x86 ALP to find factorial of a given integer on command line using recursion. ~~Explicit~~ Explicit stack manipulation is expected.

Objective :-

- i) To understand recursive procedures in ALP.
- ii) To understand stack manipulation.

S/W requirement :-

Text editor, Assembler (NASM), Debugger (GDB)

Theory :-

- Recursive procedures are special procedures that call themselves in their body.
- This results in the formation of an implicit stack whose top is the current procedure call.
- To maintain values of variable during recursion, we can use the program stack & push the most recent value on top of stack.

e.g. my-proc :

```

cmp ax, ax
jbe si
push ax
dec ax
si :

```

} Some
of
operation

```

call my-proc - recursive
ret          call to
            procedure

```

Algorithm :-

- Accept value of number through command line arguments into variable say 'x'.
- Inside procedure

1) IF $x \leq 1$, then push 1 & goto 9

2) Else

3) Push value of x to stack

4) Decrement value of x

5) call factorial procedure

6) pop values from stack

7) Pop values from stack

8) Multiply value 1 & value 2 & push it to stack

9) End

Outside procedure

10) Display values at top of stack.

Conclusion :-

Thus through explicit stack manipulation, we can understand the concepts of recursion & implement the factorial.