1. MAL Program to compute factorial of a number recursively
   Program:

```
                .data
fact:           .word   0
result:         .word   0
des_str:        .asciiz "Program to compute factorial of a number :"
i_str:          .asciiz "Enter a positive integer : "
err_str:        .asciiz "Please re-enter a positive integer!!"
o_str1:         .asciiz "The factorial of the number "
o_str2:         .asciiz " : "
newline:        .byte   '\n'
sp:             .byte   ' '


                .text
__start:        la   $8, des_str
                puts $8
                lbu  $8, newline
                putc $8
input:          la   $8, i_str
                puts $8
                get  fact       # Really a SAL instruction
                lw   $10, fact  # $10 contains the integer
                bgtz $10, proceed
                la   $8, err_str
                puts $8
                lbu  $8, newline
                putc $8
                b    input

                # $4 contains the argument
proceed:        move $4, $10
                jal  factorial

                # $30 contains the Result
                sw   $30, result
                la   $8, o_str1
                puts $8
                put  fact       #Really a SAL instruction
                la   $8, o_str2
                puts $8
                put  result     #Really a SAL instruction
                done
```

```
# Recursive Factorial Function that has the argument in $4
# and result in $30
factorial:      ble  $4, 1, term_condition
                sw   $4, 0($sp)
                add  $sp, $sp, -4
                sw   $31, 0($sp)
                add  $sp, $sp, -4
                sub  $4, $4, 1
                jal  factorial

freturn:        add  $sp, $sp, 4
                lw   $31, 0($sp)
                add  $sp, $sp, 4
                lw   $4, 0($sp)
                mul  $30, $30, $4
                jr   $31

term_condition: li   $30, 1
                jr   $31
```

Output:

```
Program to compute factorial of a number :
Enter a positive integer : 8
The factorial of the number 8 : 40320
```