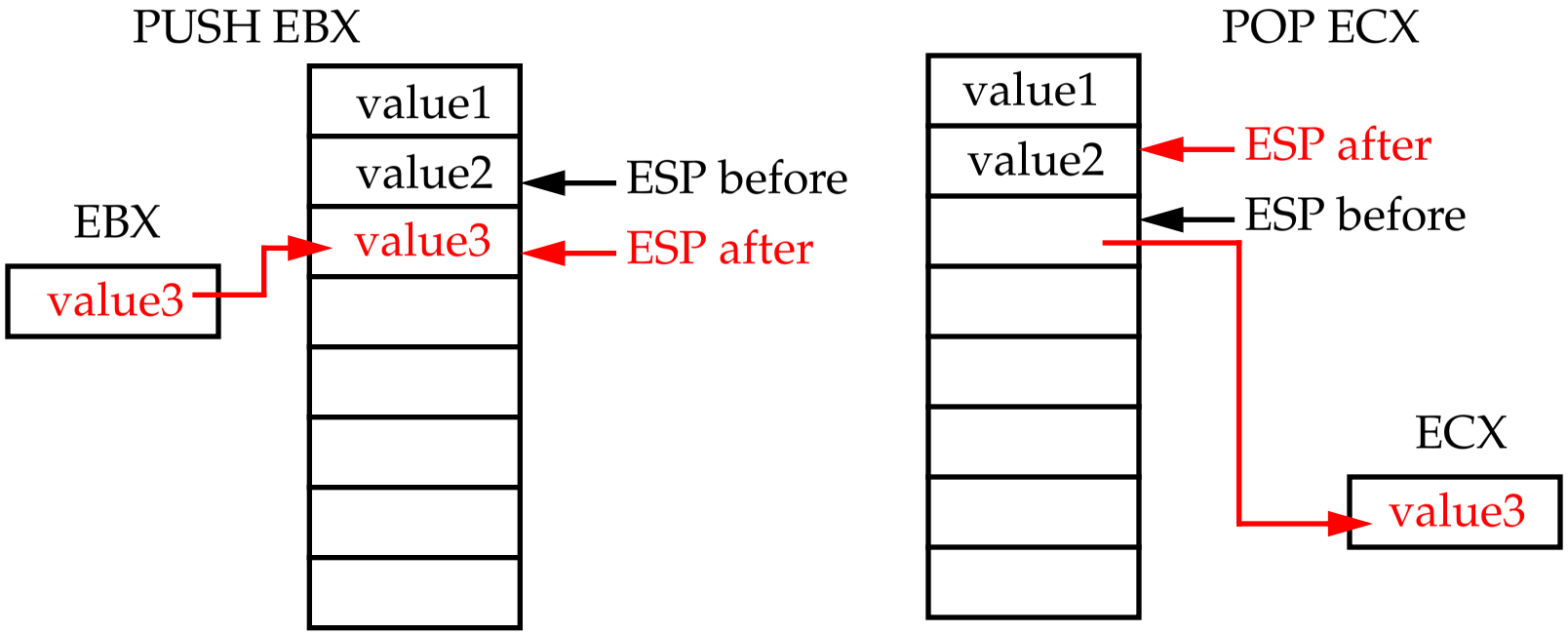
Purpose of Stack

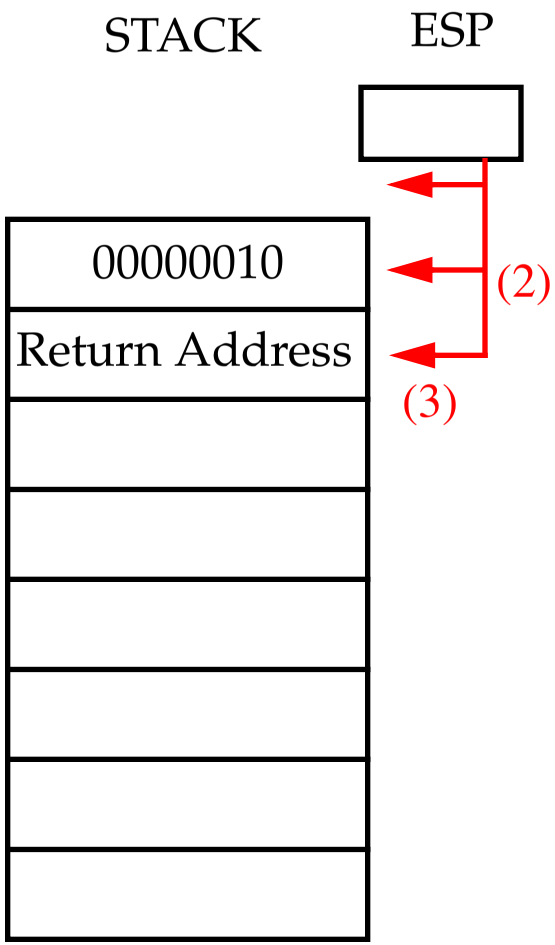
- Memory used to pass parameters to procedures.
- Memory used for allocating space for local variables.
- Save return address in procedure calls.
- Save registers to be preserved across procedure calls.



Passing Parameters to Procedures

```
        section .data
input_filename_ptr :  dd 0          (1)

        section .text
main:
        push dword input_filename_ptr   (2)
        call GetCommandLine             (3)
        add esp, 4
```



(1) *input_filename_ptr :*

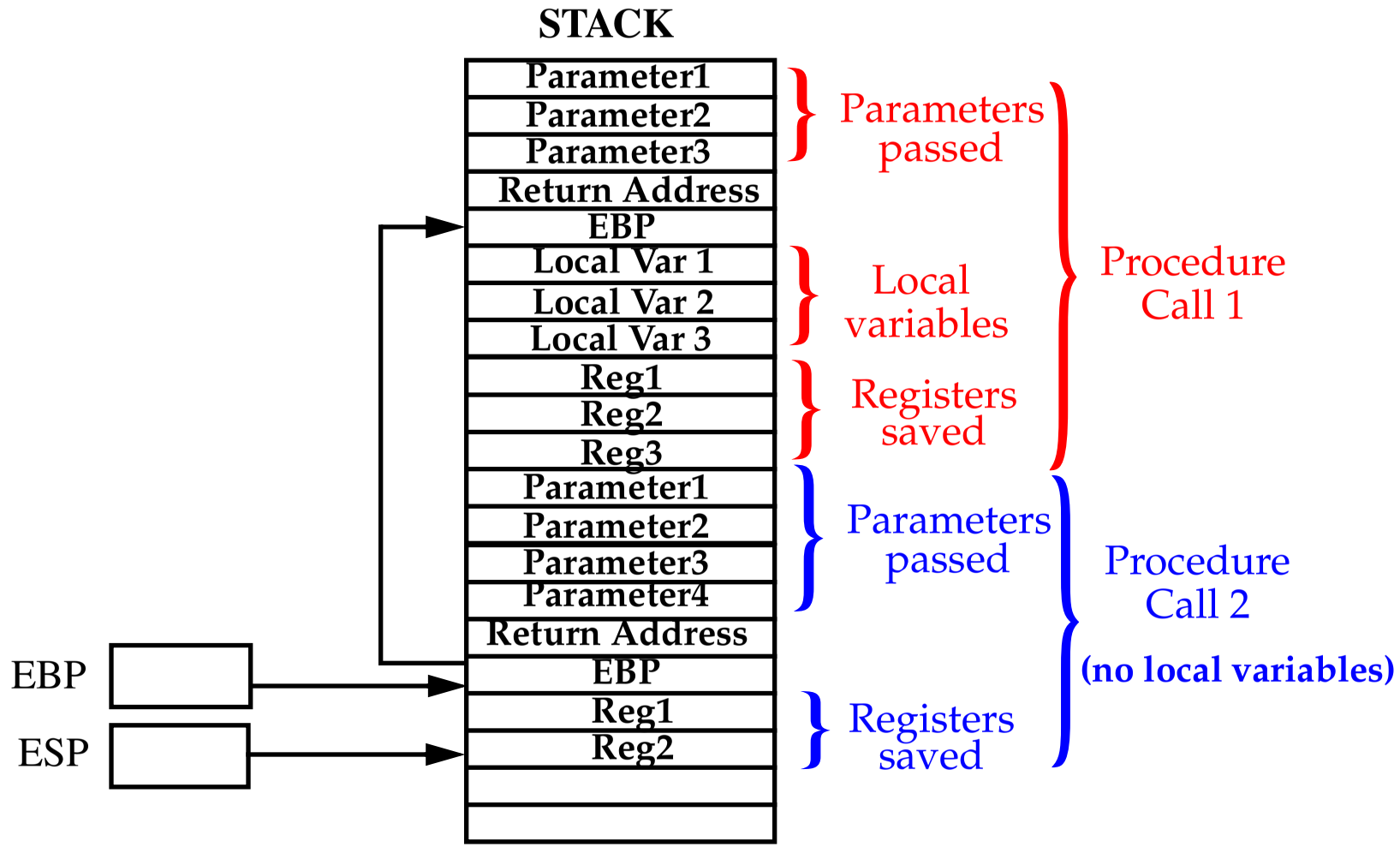
00000010 Pointer to the filename

(2) Push the address of the pointer to the filename

(3) Return address pushed to the stack.
Address of the add instruction.

Call Frames

One call frame created per procedure call



Setting up Call Frames

```
GetCommandLine:
        Enter 0                    (1)
        Push_Regs ebx, ecx, edx    (2)
```

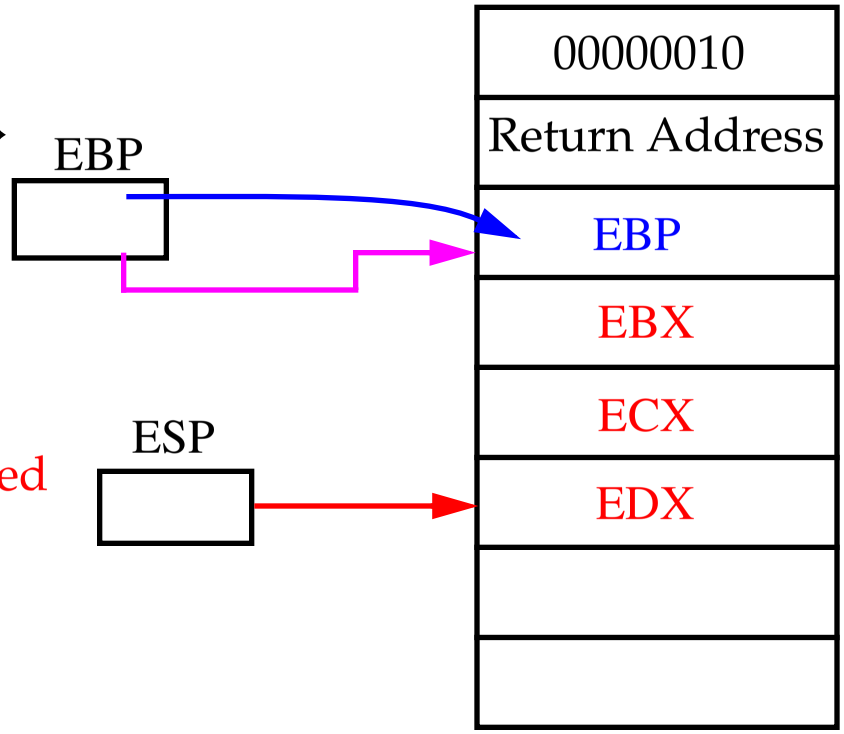
```
%macro  Enter 1
        push ebp
        mov ebp, esp
        sub esp, %1
%endmacro
```

(1) Push EBP

Move ESP into EBP
i.e. EBP points to the pushed EBP

Allocate space for local variables
(none in this example)

(2) Push the registers that are to be saved
EBX, ECX and EDX in this example



Reading Arguments

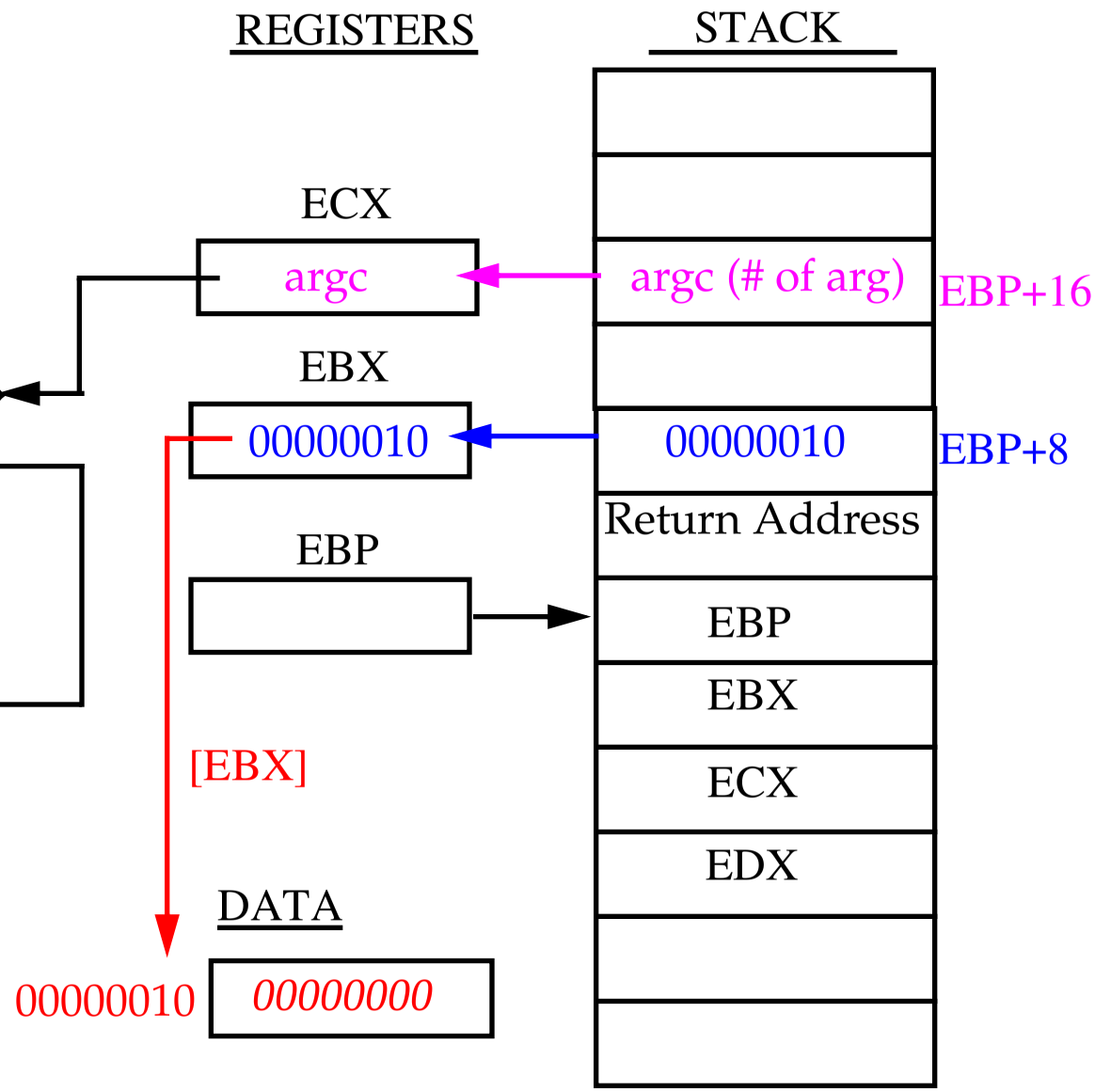
```
mov ebx, [ebp + 8]
mov [ebx], dword 0

mov ecx, [ebp + 16]
cmp ecx, 2
if ne
    jmp gcl_done
endif
```

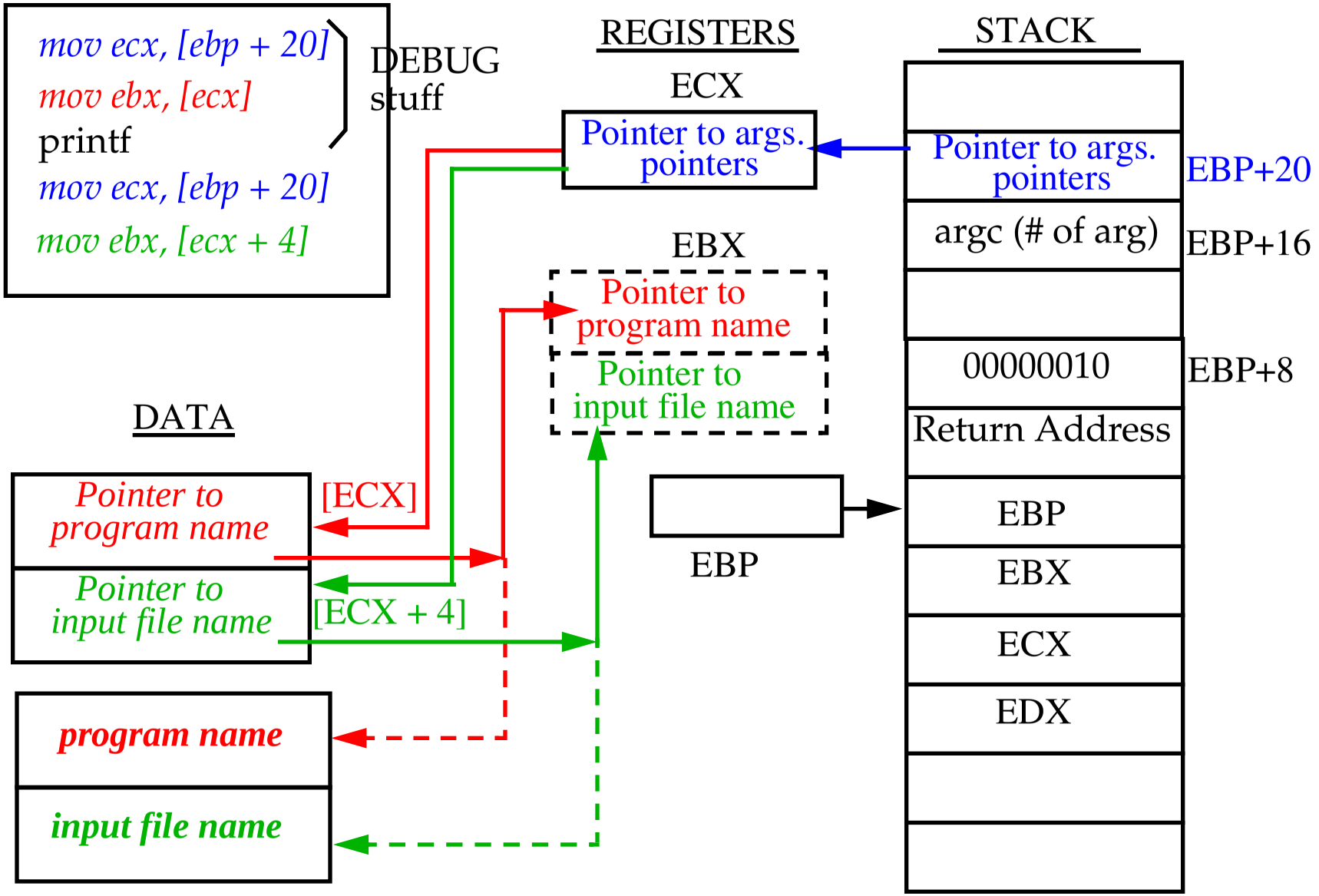
Exactly 2 arguments required

Program name and input file name

ELSE ERROR!!!



Reading Arguments



Get argument and Return

```
mov edx, [ebp + 8]
mov [edx], ebx

Pop_Regs ebx,ecx,edx
Leave
ret
```