Computer Science CSCI 261

Computer Architecture and Assembly Language

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Gnu gcc hc11 Data Type (-mshort)

○ `unsigned char`
- 8 bits

○ `short int`
- 16 bits

○ `long int`
- 32 bits

Parameter Passing Convention

○ First Input Parameter

- `unsigned char`: passed in B (with A cleared)
- `short int`: passed in D
- `long int`: passed in D, X

○ Subsequent Input Parameters

- passed on the stack (from right to left)
- `unsigned char`: 16 bits reserved on stack
- `short int`: 16 bits reserved on stack
- `long int`: 32 bits reserved on stack

○ Return Parameter

- `unsigned char`: returned in B (with A cleared)
- `short int`: returned in D
- `long int`: returned in D, X
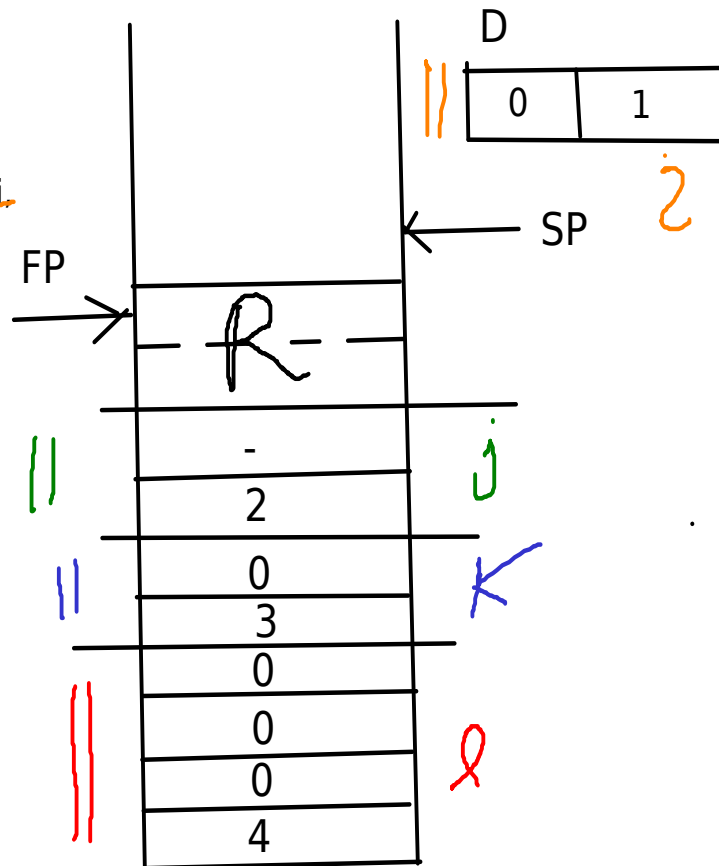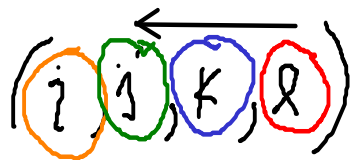
Parameter Passing Convention cont.

```
/* Driver for paramC
Peter Walsh Nov 2020 */

unsigned char foo (short int i,
          unsigned char j,
          short int k,
          long int l) {

   return (i+j+k+l);
}

unsigned char driver(void) {

   return (foo(1,2,3,4));
}
```
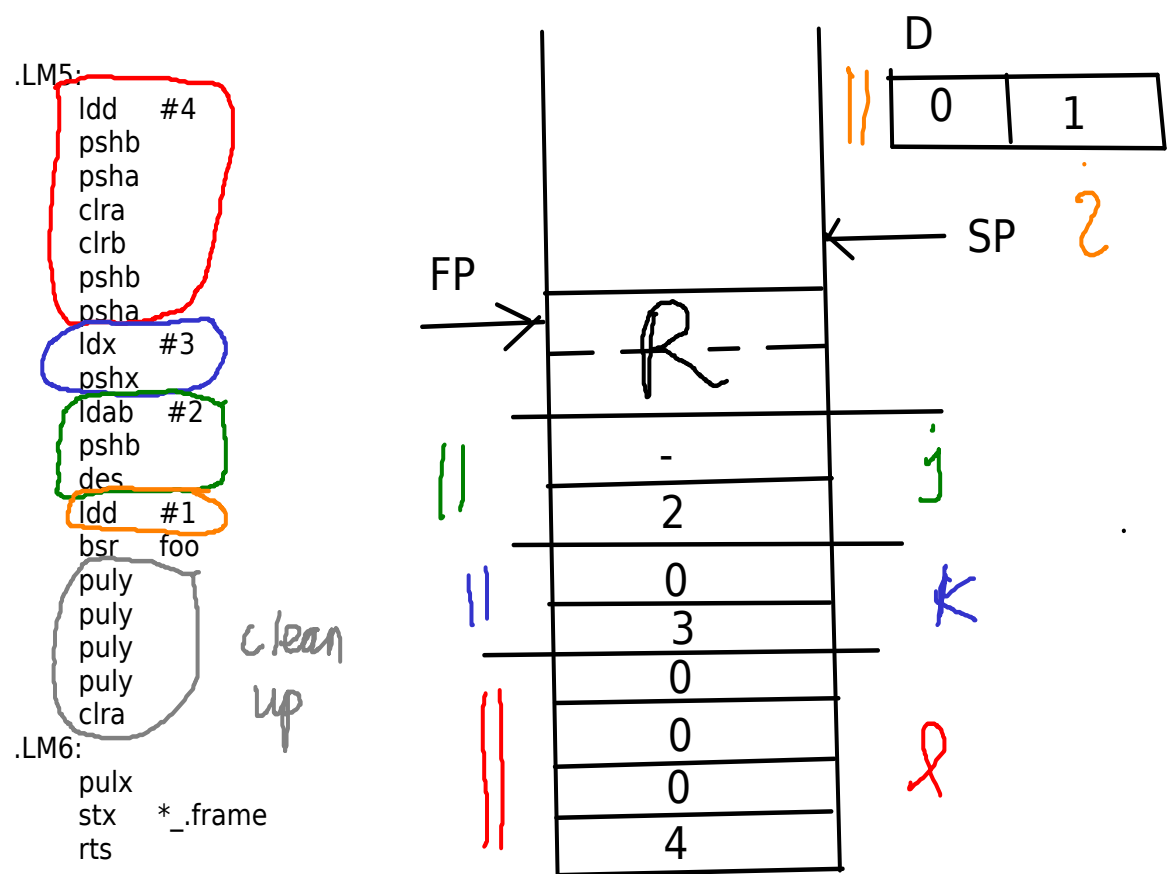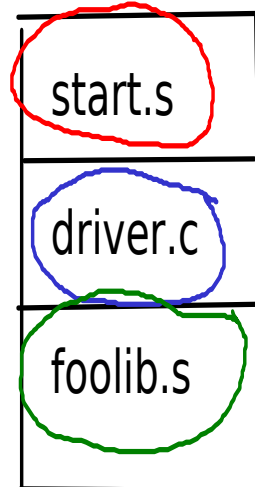
(i, j, k, l)

D

0	1

2

SP

FP

R

-

2   j

0
3   K

0

0

0   l

4

Parameter Passing Convention cont.

```
.LM5:
    ldd     #4
    pshb
    psha
    clra
    clrb
    pshb
    psha
    ldx     #3
    pshx
    ldab    #2
    pshb
    des
    ldd     #1
    bsr     foo
    puly
    puly
    puly
    puly
    clra
.LM6:
    pulx
    stx     *_.frame
    rts
```

clean up

D

| 0 | 1 |

SP

FP

R

-
2
0
3
0
0
0
4

j

k

C Examples File Structure

start.s — Set up frame pointer

driver.c — main application in C

foolib.s — assembly language routines (if needed)

C Examples File Structure (start.s)

```
;----------------------------------------
;           Text Section (code and data)
;----------------------------------------
.global _start
.extern driver
.global _.frame

.sect .page0
_.frame: .word

.sect .text

_start:
        lds #_stack    ; initialize SP
        jsr driver
startX:
        swi
```