# ELEC2041

## Microprocessors and Interfacing

## Lectures 17 : Functions in C/ Assembly - III - Extra

## http://webct.edtec.unsw.edu.au/

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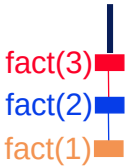
# Factorial in ARM and C

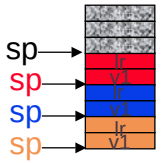
```
fact:  stmfd   sp!, {v1,lr}
       sub     fp, ip, #4
body:  mov     v1, a1       ; copy of n for mul
       cmp     v1, #1       ; n==1
       sub     a1, a1, #1   ; n -1 for fact(n-1)
       mov     a2, v1       ; return value if n=1
       beq     fin          ; return
       bl      fact         ; recursion with n-1
       mul     a2, a1, v1   ; n*fact(n-1)
fin:   mov     a1, a2        ; return 1 or n*fact(n-1)
       ldmfd   sp!, {v1,pc}
```

```
unsigned int fact(unsigned int n)
      {if (n == 1)return 1;
      else return n*fact(n-1);
      }
```



# Stack Growth and Shrinkage (#1/2)

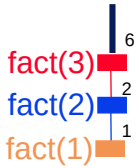


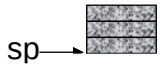




```
unsigned int fact(unsigned int n)
      {if (n == 1)return 1;
      else return n*fact(n-1);
      }
```



# Stack Growth and Shrinkage (#2/2)




```
unsigned int fact(unsigned int n)
      {if (n == 1)return 1;
      else return n*fact(n-1);
      }
```