

ARM Assembly Language & Programming

ARM7

Clicker question

Have you installed ARMSim#?

- A. Yes
- B. No

<http://armsim.cs.uvic.ca/>

B1.5

GNU Assembler Quick Reference

This section summarizes the more useful commands and expressions available with the GNU assembler, *gas*, when you target this assembler for ARM. Each assembly line has the format

```
{<label>:} {<instruction or directive>} @ comment
```

Unlike the ARM assembler, you needn't indent instructions and directives. Labels are recognized by the following colon rather than their position at the start of the line. The following example shows a simple assembly file defining a function *add* that returns the sum of the two input arguments:

```
.section      .text, "x"

.global      add                @ give the symbol add external linkage

add:
    ADD      r0, r0, r1 @ add input arguments
    MOV      pc, lr     @ return from subroutine
```

GNU Assembler Directives

Here is an alphabetical list of the more common *gas* directives.

Assembler directives

```
.align    n
.ascii    "<string>"
.asciiz   "<string>"
.byte     <byte1> {, <byte2>, ...}
.data     {<addr>}
.global   <symbol>
.text     {<addr>}
.word     <word1> {, <word2>, ...}
```

The ARMSim# User Guide

Table 4. SWI I/O operations (0x00 - 0xFF)

Opcode	Description and Action	Inputs	Outputs	EQU
swi 0x00	Display Character on Stdout	r0: the character		SWI_PrChr
swi 0x02	Display String on Stdout	r0: address of a null terminated ASCII string	(see also 0x69 below)	
swi 0x11	Halt Execution			SWI_Exit
swi 0x12	Allocate Block of Memory on Heap	r0: block size in bytes	r0:address of block	SWI_MeAlloc
swi 0x13	Deallocate All Heap Blocks			SWI_DAlloc
swi 0x66	Open File (mode values in r1 are: 0 for input, 1 for output, 2 for appending)	r0: file name, i.e. address of a null terminated ASCII string containing the name r1: mode	r0:file handle If the file does not open, a result of -1 is returned	SWI_Open
swi 0x68	Close File	r0: file handle		SWI_Close
swi 0x69	Write String to a File or to Stdout	r0: file handle or Stdout r1: address of a null terminated ASCII string		SWI_PrStr

Table 4. SWI I/O operations (0x00 - 0xFF)

Opcode	Description and Action	Inputs	Outputs	EQU
swi 0x6a	Read String from a File	r0: file handle r1: destination address r2: max bytes to store	r0: number of bytes stored	SWI_RdStr
swi 0x6b	Write Integer to a File	r0: file handle r1: integer		SWI_PrInt
swi 0x6c	Read Integer from a File	r0: file handle	r0: the integer	SWI_RdInt
swi 0x6d	Get the current time (ticks)		r0: the number of ticks (milliseconds)	SWI_Timer

.data

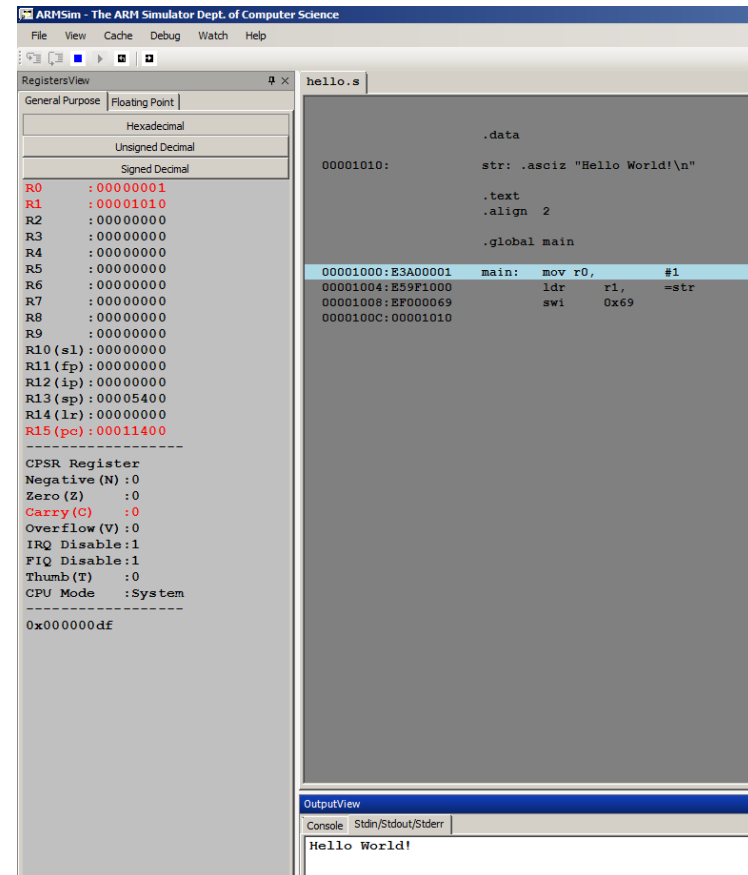
str: .asciz "Hello World!\n"

.text

.align 2

.global main

```
main: mov    r0,    #1
      ldr     r1,    =str
      swi     0x69
```



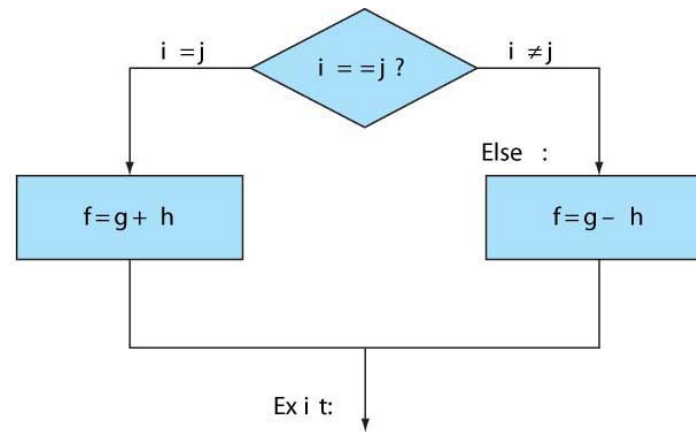
ARM Programming

➤ Branch (cmp, beq, bne)

♠ “If-then-else”

Example:

```
if(i==j)  f = g + h;
else      f = g - h;
```



assume f, g, h, i, and j are in r0, r1, r2, r3, and r4 respectively

```

CMP    r3, r4
BNE    Else
ADD    r0, r1, r2
B      Exit
Else:  sub    r0, r1, r2
Exit:
  
```

A more compact and efficient version:

```

CMP r3, r4
ADDEQ r0, r1, r2 ; f = g + h (skipped if i != j)
SUBNE r0, r1, r2 ; f = g - h (skipped if i = j)
  
```


signed versus unsigned comparison

Suppose

r0 = 1111 1111 1111 1111 1111 1111 1111 1111_{two}
r1 = 0000 0000 0000 0000 0000 0000 0000 0001_{two}

If the following instructions are executed

0x0000 1000: CMP r0, r1

0x0000 1004: BLO L1

0x0000 1008: BLT L2

Where will be the PC at?

A: L1

B: L2

C: 0x0000 100C

D: 0x0000 1010

Value	Meaning	Value	Meaning
0	EQ (Equal)	8	HI (unsigned Higher)
1	NE (Not Equal)	9	LS (unsigned Lower or Same)
2	HS (unsigned Higher or Same)	10	GE (signed Greater than or Equal)
3	LO (unsigned Lower)	11	LT (signed Less Than)
4	MI (Minus, <0)	12	GT (signed Greater Than)
5	PL - (PLus, >=0)	13	LE (signed Less Than or Equal)
6	VS (oVerflow Set, overflow)	14	AL (Always)
7	VC (oVerflow Clear, no overflow)	15	NV (reserved)

FIGURE 2.9.5 Encodings of Options for Cond field.

This example is in page 108 - 109, of Chapter 02_COD 4e ARM.pdf).

r0 = 1111 1111 1111 1111 1111 1111 1111 1111

r1 = 0000 0000 0000 0000 0000 0000 0000 0001

So, the result of $r0 - r1$ is computed (see page B1-15 in Appendix B1.pdf for details)
as $r0 + (-r1) = r0 + (\sim r1 + 1)$

```
      1111 1111 1111 1111 1111 1111 1111 1111   (r0)
+) 1111 1111 1111 1111 1111 1111 1111 1111   (~r1 + 1)
-----
01111 1111 1111 1111 1111 1111 1111 1110
```

Based on this result,

N = 1 (the result is negative, treated as two's complement)

Z = 0 (the result is not zero)

C = 1 (there is carry out of the left-most bit)

V = 0 (there is no overflow)

Therefore, the instruction "BLO" is not taken because of suffix "LO" indicates unsigned lower which is taken when carry bit is clear (See Table B1.2, in Appendix B1.pdf for details).

Instead instruction "BLT" is taken when $N \neq V$, which is the case as shown above.

Condition Mnemoics

<i>cond</i>	Mnemonic	Name	CondEx
0000	EQ	Equal	Z
0001	NE	Not equal	\bar{Z}
0010	CS / HS	Carry set / Unsigned higher or same	C
0011	CC / LO	Carry clear / Unsigned lower	\bar{C}
0100	MI	Minus / Negative	N
0101	PL	Plus / Positive of zero	\bar{N}
0110	VS	Overflow / Overflow set	V
0111	VC	No overflow / Overflow clear	\bar{V}
1000	HI	Unsigned higher	$\bar{Z}C$
1001	LS	Unsigned lower or same	$Z OR \bar{C}$
1010	GE	Signed greater than or equal	$\overline{N \oplus V}$
1011	LT	Signed less than	$N \oplus V$
1100	GT	Signed greater than	$\bar{Z}(\overline{N \oplus V})$
1101	LE	Signed less than or equal	$Z OR (N \oplus V)$
1110	AL (or none)	Always / unconditional	ignored

Value	Meaning	Value	Meaning
0	EQ (Equal)	8	HI (unsigned Higher)
1	NE (Not Equal)	9	LS (unsigned Lower or Same)
2	HS (unsigned Higher or Same)	10	GE (signed Greater than or Equal)
3	LO (unsigned Lower)	11	LT (signed Less Than)
4	MI (Minus, <0)	12	GT (signed Greater Than)
5	PL - (Plus, >=0)	13	LE (signed Less Than or Equal)
6	VS (oVerflow Set, overflow)	14	AL (Always)
7	VC (oVerflow Clear, no overflow)	15	NV (reserved)

FIGURE 2.9.5 Encodings of Options for Cond field.

TABLE B1.2 ARM condition mnemonics.

<cond>	Instruction is executed when	cpsr condition
{ AL}	ALways	TRUE
EQ	Equal (last result zero)	Z==1
NE	Not Equal (last result nonzero)	Z==0
{CS HS}	Carry Set, unsigned Higher or Same (following a compare)	C==1
{CC LO}	Carry Clear, unsigned LOwer (following a comparison)	C==0
MI	Minus (last result negative)	N==1
PL	PLUS (last result greater than or equal to zero)	N==0
VS	V flag Set (signed overflow on last result)	V==1
VC	V flag Clear (no signed overflow on last result)	V==0
HI	unsigned Higher (following a comparison)	C==1 && Z==0
LS	unsigned Lower or Same (following a comparison)	C==0 Z==1
GE	signed Greater than or Equal	N==V
LT	signed Less Than	N!=V
GT	signed Greater Than	N==V && Z==0
LE	signed Less than or Equal	N!=V Z==1
NV	NeVer—ARMv1 and ARMv2 only— <i>DO NOT USE</i>	FALSE

CMP Compare two 32-bit integers

1. CMP<cond>	Rn, #<rotated_immed>	ARMv1
2. CMP<cond>	Rn, Rm {, <shift>}	ARMv1
3. CMP	Ln, #<immed8>	THUMBv1
4. CMP	Rn, Rm	THUMBv1

Action

1. cpsr	flags	set on the result of	(Rn - <rotated_immed>)
2. cpsr	flags	set on the result of	(Rn - <shifted_Rm>)
3. cpsr	flags	set on the result of	(Ln - <immed8>)
4. cpsr	flags	set on the result of	(Rn - Rm)

Notes

- In the *cpsr*: *N* = <Negative>, *Z* = <Zero>, *C* = <NoUnsigned-Overflow>, *V* = <SignedOverflow>. The carry flag is set this way because the subtract $x - y$ is implemented as the add $x + \sim y + 1$. The carry flag is one if $x + \sim y + 1$ overflows. This happens when $x \geq y$ (equivalently when $x - \hat{A}y$ doesn't overflow).
- If *Rn* or *Rm* is *pc*, then the value used is the address of the instruction plus eight bytes for ARM instructions, or plus four bytes for Thumb instructions.

Example

```
CMP    r0, r1, LSR#2    ; compare r0 with (r1/4)
BHS    label            ; if (r0 >= (r1/4)) goto label;
```

> For 2.16.1-2, the values of r0 have a one as their left most
> bit. Should we assume these values are signed integers or
> unsigned?

Yes, you assume they are signed integers. The instruction "CMP r0, r1" subtracts value in r0 by value in r1. What matters is the subtraction result, though not saved, based on which the high 4 flag bits NZCV of the current program status register (CPSR) are set accordingly. It is these four bits that determine the behavior of the next conditional instruction.

Loop

Example:

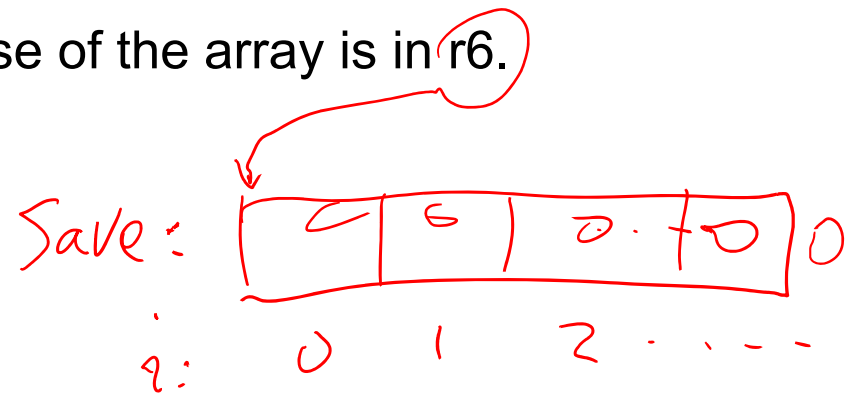
```
while (save[i] == k)
    i += 1;
```



assume i is in $r3$, k is in $r5$, and the base of the array is in $r6$.

```
Loop:  ADD    r12, r6, r3, LSL #2
        LDR    r0, [r12, #0]
        CMP    r0, r5
        BNE    Exit
        ADD    r3, r3, #1
        B      Loop
```

Exit:



➤ Procedure call and stack

motivation: abstraction and code reusability

e.g., $a * b$

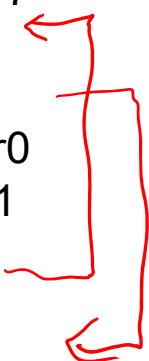
C code:

```
while(b != 0) {  
    sum = sum + a;  
    b = b - 1;  
}
```

ARM Assembly code:

@ assume a is in r0, b is in r1

	sub	r7, r7, r7	@ initialize
Loop:	cmp	r1, #0	
	beq	Done	@if b == 0
	add	r7, r7, r0	@sum += b
	sub	r1, r1, 1	@a = a-1
	b	Loop	
Done:			



How do we make use of that piece of code (let's give it a name MUL)?

E.g., $a * b + c$

solution 1: ("*cut-and-paste*": embed the code of MUL to where it is needed)
(a valid approach under certain circumstances, inline function in C++)

@ assume a, b, c, are in r0, r1, r7

```

                mov    r2, r7    @ move c out of r7, as it is to be used by MUL

Loop:  sub    r7, r7, r7        @initialize
      cmp    r1, #0
      beq    Done              @ if b == 0
      add    r7, r7, r0        @ sum += a
      sub    r1, r1, #1        @b = b-1
      b      Loop

Done:  add    r7, r7, r2        @add c to a*b
```

Can we reuse the routine "MUL" multiple times?

We don't want to write the same piece of code wherever it is used; we may not know how many times it is to be used when we write the code, e.g., multiply integer a by itself for b times where b is an integer to be read from the keyboard.

So we want to write the MUL code once and reuse it.

E.g., $a*a + b*b + c*c$

Solution 2: ("call-by-name": Jump to the MUL code and jump back when it is done)

@ assume a, b, c, are in r2, r3, r4

Why do we need to move a to r0 and b to r1?

	<u>mov</u>	<u>r0, r2</u>	@ move a to r0
	<u>move</u>	<u>r1, r3</u>	@ move b to r1
	b	MUL	@ call MUL, product a*b will be put in r7
Done:	add	r7, r7, r4	@add c to a*b

MUL:

	sub	r7, r7, r7	@initialize
Loop:	cmp	r1, #0	
	beq	Done	@if b == 0
	add	r7, r7, r0	# sum += a
	sub	r1, r1, #1	# b = b-1
	b	Loop	

We want "MUL" to return to the next instruction where it is called. In this example, the return address "Done" is hard coded -- so it can only return to one place.

@ For example, let's compute $a*a + b*b$
 @ assume a, b, c, are in r2 and r3

	mov r0, r2	@ copy a to r0
	mov <u>r0</u> , r2	@ copy a to r1
	b MUL	@ call MUL, product $a*a$ will be in r7
Done:	mov r4, r7	@ move $a*a$ to r4
	mov r0, r3	@ copy b to r0
	mov r1, r3	@ copy b to r1
	b MUL	@ call MUL, product $b*b$ will be in r7
Done?:	add r7, r7, r4	@ $a*a + b*b$ is put to r7

MUL: X

Loop: {

sub	\$v0, \$v0, \$v0	# initialize
beq	\$0, \$a1, Done	# if $a == 0$
add	\$v0, \$v0, \$a0	# $sum += a$
subi	\$a1, \$a1, 1	# $b = b-1$
j	Loop	

A hard-coded return address
 "Done" is not working well --
 it can only return to one
 place.

Solution:

1. save the return address to a register before calling the subroutine
2. jump to the saved return address when the subroutine is done.

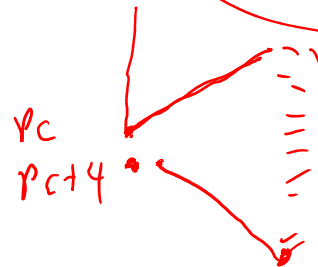
Hardware support.

bl ProcedureAddress

@save the return address (PC+4) into a designated
@register r14 and then jump to the address of the callee.

mov pc, r14

@ reset PC to the return address stored in register r14.



@ For example, let's compute $a*a + b*b$

@ assume a and b are in r3 and r4

mov	r0, r3	@ copy a to r0
mov	r1, r3	@ copy b to r1
bl	MUL	How do you know it
		@ call MUL, <u>address of next instruction is put in r14</u>
mov	r5, r7	@ move $a*a$ to r5

mov	r0, r4	@ copy b to r0
mov	r1, r4	@ copy b to r1
bl	MUL	@call MUL, address of next instruction is put in r14
add	r7, r7, r5	@ $a*a + b*b$ is put to r7

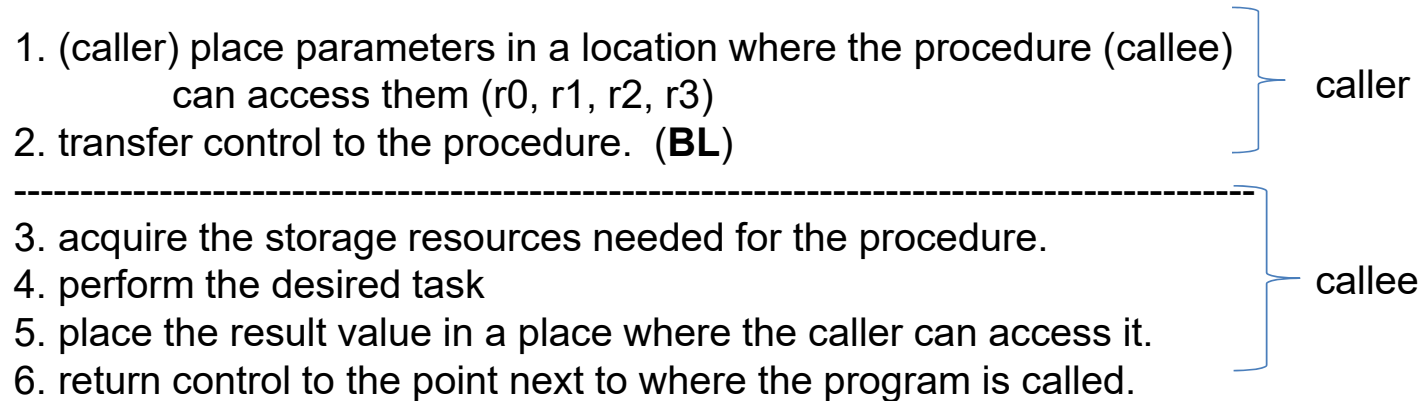
MUL:

	sub	r7, r7, r7	@ initialize
Loop:	cmp	r1, #0	
	beq	Done	@ if $a == 0$
	add	r7, r7, r0	@ $sum += a$
	sub	r1, r1, #1	@ $b = b-1$

b Loop

Done:	mov	pc, r14	@ a procedure always ends with this instruction
-------	-----	---------	---

Six steps

1. (caller) place parameters in a location where the procedure (callee) can access them (r0, r1, r2, r3)
 2. transfer control to the procedure. (**BL**)
-
3. acquire the storage resources needed for the procedure.
 4. perform the desired task
 5. place the result value in a place where the caller can access it.
 6. return control to the point next to where the program is called.
(**MOV pc, r14**)
- 

ARM conventions:

- r0 - r3, r12: registers for storing arguments or scratch registers to used by the callee (not preserved)
- r4-r11: registers that need to be preserved, if used by callee
- ~~lr~~: register storing the return address (r14)
- ~~sp~~: stack pointer (r13)

Clicker question:

What is a leaf-procedure?

- A. It is a routine you do during the fall to clean up the falling leaves.
- B. It is a procedure that does not call any other procedures
- C. It is a procedure that is not called by any other procedures
- D. It is a procedure that calls other procedures but itself
- E. It is a procedure that calls only itself.

What if a procedure calls another procedure?

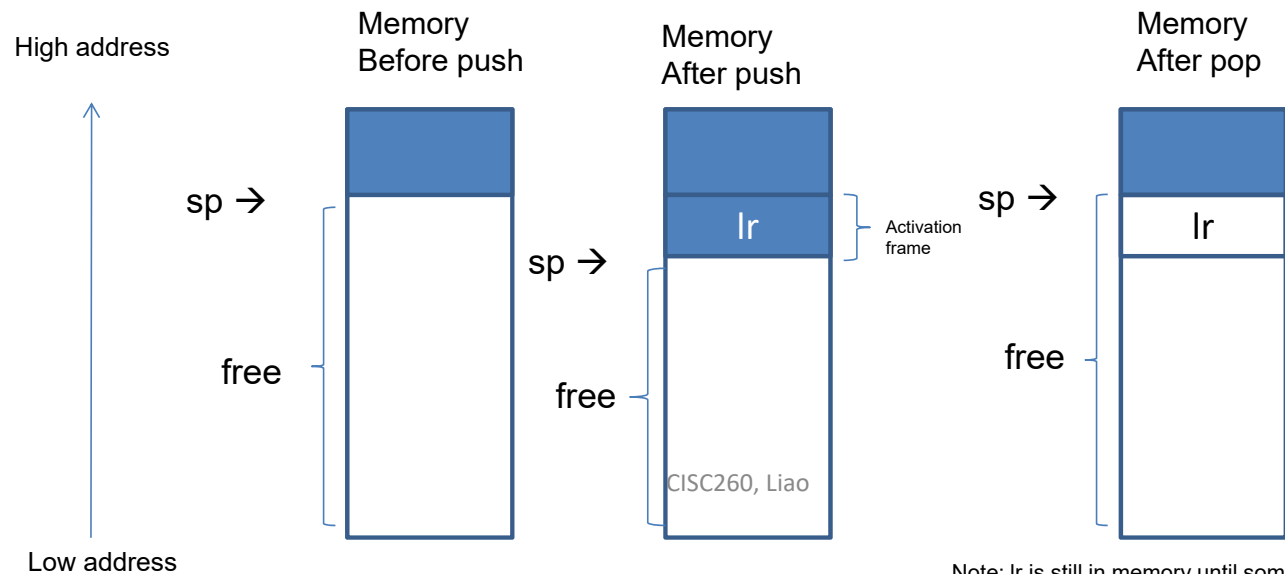
	PC →	Addr:			
...		...	bl	proc1	@ r14 = *
proc1(a);		.			
...		*	...		
...			
...			
.			
proc1(A) {		proc1:			
...			
...			
proc2(A);		.	bl	proc2	@r14 = * *
...		**	...		
}		.	mov	pc, r14	@r14 has wrong return address
		.			
proc2(B) {		proc2:			
...			
...			
...			
}		.	mov	pc, r14	
		.			

Follow the PC and monitor the value change in r14

Solution: Stack (LIFO)

Acquire storage space, called activation frame

SUB	sp, sp, #4	@ push
STR	r14, [sp]	@ push
...		
...		
...		
LDR	r14, [sp]	@ pop
ADD	sp, sp, #4	@ pop
MOV	pc, r14	



Note: lr is still in memory until some new value is written in the same location. Potential security loophole.

```
Main() {  
    int n = 4;  
    int res = fact(n);  
    printf(res);  
}
```

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

fact:

SUB sp, sp, #8
STR lr, [sp, #0]
STR r1, [sp, #4]

@move stack pointer downwards to accommodate 2 items
@store the return address
@store the argument n

CMP r1, #1
BGE Else

@check if $n < 1$
@ branch to Else if $n \geq 1$

MOV r1, #1
ADD sp, sp, #8

@ make a value of 1, and save it to register \$r1
@ POP 2 items off the stack; lr and r1 haven't been overwritten,
@ so need not to restore
@ return

MOV pc, lr

Else: **SUB r1, r1, #1**
BL fact
MOV r2, r1
LDR r1, [sp, #4]
LDR lr, [sp, #0]
ADD sp, sp, #8

@ $n = (n-1)$
@ call fact with argument $(n-1)$; lr and r1 are overwritten

@ restore r1
@ restore r14
@ move stack pointer upwards

MUL r1, r1, r2

@ multiply $\text{fact}(n-1)$ in r2 with n in r1 and write the result to r1

MOV pc, lr

@ return to the caller

Q: The instruction `MOV r1, #1` will overwrite what's already in `r1`. Is that a problem?

- A. Yes
- B. No

$$\begin{aligned} F(4) &= 4 * F(3) = 4 * 3 * F(2) = \\ &4 * 3 * 2 * F(1) = 4 * 3 * 2 * 1 * F(0) = \\ &4 * 3 * 2 * 1 * 1 \end{aligned}$$

Address:

0x 0000 1000	fact: SUB sp, sp, #8
0x 0000 1004	STR lr, [sp, #0]
0x 0000 1008	STR r1, [sp, #4]
0x 0000 100C	CMP r1, #1
0x 0000 1010	BGE Else
0x 0000 1014	MOV r1, #1
0x 0000 1018	ADD sp, sp, #8
0x 0000 101C	MOV pc, lr
0x 0000 1020	Else: SUB r1, r1, #1
0x 0000 1024	BL fact
0x 0000 1028	MOV r2, r1
0x 0000 102C	LDR r1, [sp, #4]
0x 0000 1030	LDR lr, [sp, #0]
0x 0000 1034	ADD sp, sp, #8
0x 0000 1038	MUL r1, r1, r2
0x 0000 103C	MOV pc, lr

Note: The following is for the 32-bit ARM7, see Chapter 02_COD 4e ARM

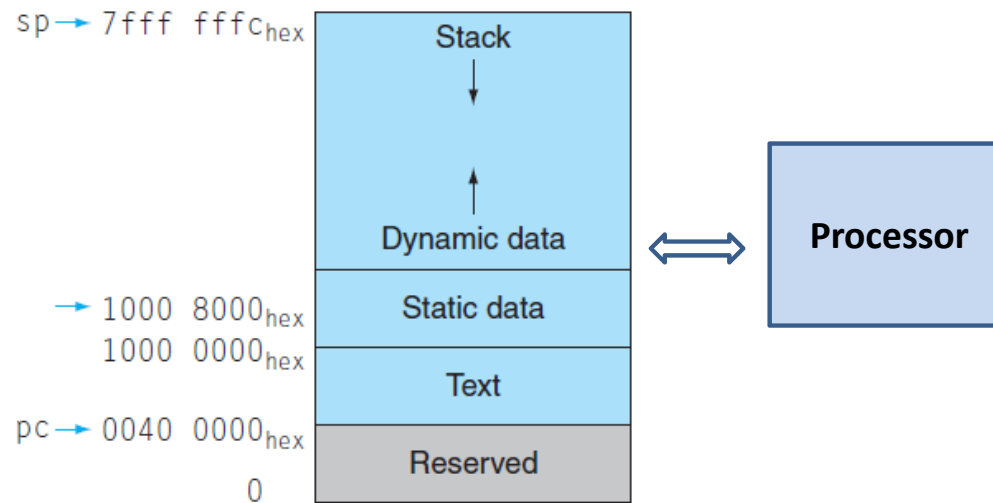


FIGURE 2.13 Typical ARM memory allocation for program and data. These addresses are only a software convention, and not part of the ARM architecture. The stack pointer is initialized to $7fff\ fff_{hex}$ and grows down toward the data segment. At the other end, the program code (“text”) starts at $0040\ 0000_{hex}$. The static data starts at $1000\ 0000_{hex}$. Dynamic data, allocated by `malloc` in C and by `new` in Java, is next. It grows up toward the stack in an area called the heap.

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000000
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 00005400
R14 (lr) : 00000000
R15 (pc) : 00001000

CPSR Register
Negative (N) : 0
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x000000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer to console
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00000000
000053FC: 00000000
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000
00005448: 00000000
0000544C: 00000000



RegistersView

General Purpose Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
 R1 : 00000004
 R2 : 00000000
 R3 : 00000000
 R4 : 00000000
 R5 : 00000000
 R6 : 00000000
 R7 : 00000000
 R8 : 00000000
 R9 : 00000000
 R10 (s1) : 00000000
 R11 (fp) : 00000000
 R12 (ip) : 00000000
 R13 (sp) : 00005400
 R14 (lr) : 00000000
 R15 (pc) : 00001004

CPSR Register

Negative (N) : 0

Zero (Z) : 0

Carry (C) : 0

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0

CPU Mode : System

0x000000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register 0
0000100C:EF00006B      SWI 0x6b        @ Print integer 1
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000	E3A01004	EB000002	E3A00001	EF00006B
00001010	EF000011	E24DD008	E58DE000	E58D1004
00001020	E3510001	AA000002	E3A01001	E28DD008
00001030	E1A0F00E	E2411001	EBFFFFFF5	E1A02001

StackView

000053B0: 00000000
 000053B4: 00000000
 000053B8: 00000000
 000053BC: 00000000
 000053C0: 00000000
 000053C4: 00000000
 000053C8: 00000000
 000053CC: 00000000
 000053D0: 00000000
 000053D4: 00000000
 000053D8: 00000000
 000053DC: 00000000
 000053E0: 00000000
 000053E4: 00000000
 000053E8: 00000000
 000053EC: 00000000
 000053F0: 00000000
 000053F4: 00000000
 000053F8: 00000000
 000053FC: 00000000
 00005400: 00000000
 00005404: 00000000
 00005408: 00000000
 0000540C: 00000000
 00005410: 00000000
 00005414: 00000000
 00005418: 00000000
 0000541C: 00000000
 00005420: 00000000
 00005424: 00000000
 00005428: 00000000
 0000542C: 00000000
 00005430: 00000000
 00005434: 00000000
 00005438: 00000000
 0000543C: 00000000
 00005440: 00000000
 00005444: 00000000
 00005448: 00000000
 0000544C: 00000000

FileViewCacheDebugWatchHelp

RegistersView

General PurposeFloating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
R1 : 00000004
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 00005400
R14 (lr) : 00001008
R15 (pc) : 00001014

CPSR Register
Negative (N) : 0
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x000000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00000000
000053FC: 00000000
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000
00005448: 00000000
0000544C: 00000000

MemoryView3

00001000

Word Size
8Bit16Bit32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000004
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f8
R14 (lr) : 00001008
R15 (pc) : 00001018

CPSR Register

Negative (N) : 0
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x000000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00000000
000053FC: 00000000
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000004
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1): 00000000
R11 (fp): 00000000
R12 (ip): 00000000
R13 (sp): 000053f8
R14 (lr): 00001008
R15 (pc): 0000101c

CPSR Register
Negative (N) : 0
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x000000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register 0
0000100C:EF00006B      SWI 0x6b      @ Print integer 0
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

00001000

00001000	E3A01004	EB000002	E3A00001	EF00006B
00001010	EF000011	E24DD008	E58DE000	E58D1004
00001020	E3510001	AA000002	E3A01001	E28DD008
00001030	E1A0F00E	E2411001	EBFFFFF5	E1A02001

StackView

000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00001008
000053FC: 00000000
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000004
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f8
R14 (lr) : 00001008
R15 (pc) : 00001020

CPSR Register

Negative (N) : 0

Zero (Z) : 0

Carry (C) : 0

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0

CPU Mode : System

0x000000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register 0
0000100C:EF00006B      SWI 0x6b        @ Print integer 0
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFFF5 E1A02001

StackView

000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000

File
View
Cache
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RegistersView

General Purpose
Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000004
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1): 00000000
R11 (fp): 00000000
R12 (ip): 00000000
R13 (sp): 000053f8
R14 (lr): 00001008
R15 (pc): 00001024

CPSR Register

Negative (N) : 0
Zero (Z) : 0
Carry (C) : 1
Overflow (V) : 0
IRQ Disable: 1
FIQ Disable: 1
Thumb (T) : 0
CPU Mode : System

0x200000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer to console
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000

MemoryView3

00001000

Word Size
8Bit
16Bit
32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFFF5 E1A02001

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000004
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1): 00000000
R11 (fp): 00000000
R12 (ip): 00000000
R13 (sp): 000053f8
R14 (lr): 00001008
R15 (pc): 00001034

CPSR Register

Negative (N) : 0

Zero (Z) : 0

Carry (C) : 1

Overflow (V) : 0

IRQ Disable: 1

FIQ Disable: 1

Thumb (T) : 0

CPU Mode : System

0x200000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer to console
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000	E3A01004	EB000002	E3A00001	EF00006B
00001010	EF000011	E24DD008	E58DE000	E58D1004
00001020	E3510001	AA000002	E3A01001	E28DD008
00001030	E1A0F00E	E2411001	EBFFFFF5	E1A02001

StackView

000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000

FileViewCacheDebugWatchHelp

RegistersView

General PurposeFloating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
R1 : 00000003
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f8
R14 (lr) : 00001008
R15 (pc) : 00001038

CPSR Register
Negative (N) : 0
Zero (Z) : 0
Carry (C) : 1
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x200000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1

00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000

MemoryView3

00001000

Word Size
8Bit16Bit32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

FileViewCacheDebugWatchHelp

RegistersView

General PurposeFloating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0: 00000000

R1: 00000003

R2: 00000000

R3: 00000000

R4: 00000000

R5: 00000000

R6: 00000000

R7: 00000000

R8: 00000000

R9: 00000000

R10 (s1): 00000000

R11 (fp): 00000000

R12 (ip): 00000000

R13 (sp): 000053f8

R14 (lr): 0000103c

R15 (pc): 00001014

CPSR Register

Negative (N): 0

Zero (Z): 0

Carry (C): 1

Overflow (V): 0

IRQ Disable: 1

FIQ Disable: 1

Thumb (T): 0

CPU Mode: System

0x200000df

fact.s

00001000:main:

00001000:E3A01004mov r1, #4

00001004:EB000002bl fact

00001008:E3A00001MOV r0, #1 @ Load 1 into register

0000100C:EF00006BSWI 0x6b @ Print integer

00001010:EF000011SWI 0x11 @ Stop program execution

00001014:E24DD008fact: sub sp, sp, #8

00001018:E58DE000str lr, [sp,#0]

0000101C:E58D1004str r1, [sp,#4]

00001020:E3510001cmp r1,#1

00001024:AA000002bge L1

00001028:E3A01001mov r1, #1

0000102C:E28DD008add sp, sp, #8

00001030:E1A0F00Emov pc, lr

00001034:E2411001L1: sub r1, r1, #1

00001038:EBFFFFF5BL fact

0000103C:E1A02001mov r2, r1

00001040:E59D1004ldr r1, [sp, #4]

00001044:E59DE000ldr lr, [sp, #0]

00001048:E28DD008add sp, sp, #8

0000104C:E0010192mul r1, r2, r1

00001050:E1A0F00Emov pc, lr

StackView

000053A8: 00000000

000053AC: 00000000

000053B0: 00000000

000053B4: 00000000

000053B8: 00000000

000053BC: 00000000

000053C0: 00000000

000053C4: 00000000

000053C8: 00000000

000053CC: 00000000

000053D0: 00000000

000053D4: 00000000

000053D8: 00000000

000053DC: 00000000

000053E0: 00000000

000053E4: 00000000

000053E8: 00000000

000053EC: 00000000

000053F0: 00000000

000053F4: 00000000

000053F8: 00001008

000053FC: 00000004

00005400: 00000000

00005404: 00000000

00005408: 00000000

0000540C: 00000000

00005410: 00000000

00005414: 00000000

00005418: 00000000

0000541C: 00000000

00005420: 00000000

00005424: 00000000

00005428: 00000000

0000542C: 00000000

00005430: 00000000

00005434: 00000000

00005438: 00000000

0000543C: 00000000

00005440: 00000000

00005444: 00000000

MemoryView3

00001000

Word Size8Bit16Bit32Bit


00001000E3A01004EB000002E3A00001EF00006B

00001010EF000011E24DD008E58DE000E58D1004

00001020E3510001AA000002E3A01001E28DD008

00001030E1A0F00EE2411001EBFFFFF5E1A02001

File View Cache Debug Watch Help

RegistersView  ×

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000003
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f0
R14 (lr) : 0000103c
R15 (pc) : 00001018


CPSR Register
Negative (N) : 0
Zero (Z) : 0
Carry (C) : 1
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x200000df


fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

StackView  ×

000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 00000000
000053F4: 00000000
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000

MemoryView3  ×

Word Size 8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000003
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1): 00000000
R11 (fp): 00000000
R12 (ip): 00000000
R13 (sp): 000053f0
R14 (lr): 0000103c
R15 (pc): 0000101c

CPSR Register

Negative (N) : 0
Zero (Z) : 0
Carry (C) : 1
Overflow (V) : 0
IRQ Disable: 1
FIQ Disable: 1
Thumb (T) : 0
CPU Mode : System

0x200000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer to console
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 0000103c
000053F4: 00000000
000053F8: 00001000
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000

FileViewCacheDebugWatchHelp

RegistersView

General PurposeFloating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0: 00000000

R1: 00000003

R2: 00000000

R3: 00000000

R4: 00000000

R5: 00000000

R6: 00000000

R7: 00000000

R8: 00000000

R9: 00000000

R10 (s1): 00000000

R11 (fp): 00000000

R12 (ip): 00000000

R13 (sp): 000053f0

R14 (lr): 0000103c

R15 (pc): 00001020

CPSR Register

Negative (N): 0

Zero (Z): 0

Carry (C): 1

Overflow (V): 0

IRQ Disable: 1

FIQ Disable: 1

Thumb (T): 0

CPU Mode: System

0x200000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053A0: 00000000

000053A4: 00000000

000053A8: 00000000

000053AC: 00000000

000053B0: 00000000

000053B4: 00000000

000053B8: 00000000

000053BC: 00000000

000053C0: 00000000

000053C4: 00000000

000053C8: 00000000

000053CC: 00000000

000053D0: 00000000

000053D4: 00000000

000053D8: 00000000

000053DC: 00000000

000053E0: 00000000

000053E4: 00000000

000053E8: 00000000

000053EC: 00000000

000053F0: 0000103C

000053F4: 00000003

000053F8: 00001008

000053FC: 00000004

00005400: 00000000

00005404: 00000000

00005408: 00000000

0000540C: 00000000

00005410: 00000000

00005414: 00000000

00005418: 00000000

0000541C: 00000000

00005420: 00000000

00005424: 00000000

00005428: 00000000

0000542C: 00000000

00005430: 00000000

00005434: 00000000

00005438: 00000000

0000543C: 00000000

MemoryView3

00001000

Word Size

8Bit16Bit32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B

00001010 EF000011 E24DD008 E58DE000 E58D1004

00001020 E3510001 AA000002 E3A01001 E28DD008

00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

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RegistersView

General Purpose
Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000003
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f0
R14 (lr) : 0000103c
R15 (pc) : 00001024

CPSR Register

Negative (N) : 0
Zero (Z) : 0
Carry (C) : 1
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x200000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000

MemoryView3

00001000

Word Size
8Bit
16Bit
32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

File View Cache Debug Watch Help

RegistersView

General Purpose Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000

R1 : 00000003

R2 : 00000000

R3 : 00000000

R4 : 00000000

R5 : 00000000

R6 : 00000000

R7 : 00000000

R8 : 00000000

R9 : 00000000

R10 (s1): 00000000

R11 (fp): 00000000

R12 (ip): 00000000

R13 (sp): 000053f0

R14 (lr): 0000103c

R15 (pc): 00001034

CPSR Register

Negative (N) : 0

Zero (Z) : 0

Carry (C) : 1

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0

CPU Mode : System

0x200000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053A0: 00000000

000053A4: 00000000

000053A8: 00000000

000053AC: 00000000

000053B0: 00000000

000053B4: 00000000

000053B8: 00000000

000053BC: 00000000

000053C0: 00000000

000053C4: 00000000

000053C8: 00000000

000053CC: 00000000

000053D0: 00000000

000053D4: 00000000

000053D8: 00000000

000053DC: 00000000

000053E0: 00000000

000053E4: 00000000

000053E8: 00000000

000053EC: 00000000

000053F0: 0000103C

000053F4: 00000003

000053F8: 00001008

000053FC: 00000004

00005400: 00000000

00005404: 00000000

00005408: 00000000

0000540C: 00000000

00005410: 00000000

00005414: 00000000

00005418: 00000000

0000541C: 00000000

00005420: 00000000

00005424: 00000000

00005428: 00000000

0000542C: 00000000

00005430: 00000000

00005434: 00000000

00005438: 00000000

0000543C: 00000000

MemoryView3

Word Size 8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B

00001010 EF000011 E24DD008 E58DE000 E58D1004

00001020 E3510001 AA000002 E3A01001 E28DD008

00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000002
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (sl) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f0
R14 (lr) : 0000103c
R15 (pc) : 00001038

CPSR Register
Negative (N) : 0
Zero (Z) : 0
Carry (C) : 1
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System
0x200000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer to console
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1

00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000

File
View
Cache
Debug
Watch
Help

RegistersView

General Purpose

Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
R1 : 00000002
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f0
R14 (lr) : 0000103c
R15 (pc) : 00001014

CPSR Register
Negative (N) : 0
Zero (Z) : 0
Carry (C) : 1
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x200000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 00000000
000053DC: 00000000
000053E0: 00000000
000053E4: 00000000
000053E8: 00000000
000053EC: 00000000
000053F0: 0000103c
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFFF5 E1A02001

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RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000000
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053d8
R14 (lr) : 0000103c
R15 (pc) : 00001020

CPSR Register

Negative (N) : 0

Zero (Z) : 1

Carry (C) : 1

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0

CPU Mode : System

0x600000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer to console
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000	E3A01004	EB000002	E3A00001	EF00006B
00001010	EF000011	E24DD008	E58DE000	E58D1004
00001020	E3510001	AA000002	E3A01001	E28DD008
00001030	E1A0F00E	E2411001	EBFFFFF5	E1A02001

StackView

00005388: 00000000
0000538C: 00000000
00005390: 00000000
00005394: 00000000
00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000

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RegistersView

General PurposeFloating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
R1 : 00000000
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053d8
R14 (lr) : 0000103c
R15 (pc) : 00001024

CPSR Register

Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into reg
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program ex

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

00005388: 00000000
0000538C: 00000000
00005390: 00000000
00005394: 00000000
00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000

MemoryView3

00001000

Word Size
8Bit16Bit32Bit

00001000	E3A01004	EB000002	E3A00001	EF00006B
00001010	EF000011	E24DD008	E58DE000	E58D1004
00001020	E3510001	AA000002	E3A01001	E28DD008
00001030	E1A0F00E	E2411001	EBFFFFF5	E1A02001

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StackView

General Purpose
Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000000
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053d8
R14 (lr) : 0000103c
R15 (pc) : 00001028

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register 0
0000100C:EF00006B      SWI 0x6b        @ Print integer 0
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

MemoryView3
Word Size
8Bit
16Bit
32Bit

```

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFFF5 E1A02001

```

```

00005388: 00000000
0000538C: 00000000
00005390: 00000000
00005394: 00000000
00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000

```

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General Purpose
Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000001
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1): 00000000
R11 (fp): 00000000
R12 (ip): 00000000
R13 (sp): 000053d8
R14 (lr): 0000103c
R15 (pc): 0000102c

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable: 1
FIQ Disable: 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer to console
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView
✕

00005388: 00000000
0000538C: 00000000
00005390: 00000000
00005394: 00000000
00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000

MemoryView3
✕

00001000

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

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RegistersView

General Purpose

Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
R1 : 00000001
R2 : 00000000
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053e0
R14 (lr) : 0000103c
R15 (pc) : 00001030

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

00005390: 00000000
00005394: 00000000
00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFFF5 E1A02001

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RegistersView

General PurposeFloating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0: 00000000

R1: 00000001

R2: 00000000

R3: 00000000

R4: 00000000

R5: 00000000

R6: 00000000

R7: 00000000

R8: 00000000

R9: 00000000

R10 (sl): 00000000

R11 (fp): 00000000

R12 (ip): 00000000

R13 (sp): 000053e0

R14 (lr): 0000103c

R15 (pc): 0000103c

CPSR Register

Negative (N): 1

Zero (Z): 0

Carry (C): 0

Overflow (V): 0

IRQ Disable: 1

FIQ Disable: 1

Thumb (T): 0

CPU Mode: System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register 0
0000100C:EF00006B      SWI 0x6b        @ Print integer 0
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

00005390: 00000000

00005394: 00000000

00005398: 00000000

0000539C: 00000000

000053A0: 00000000

000053A4: 00000000

000053A8: 00000000

000053AC: 00000000

000053B0: 00000000

000053B4: 00000000

000053B8: 00000000

000053BC: 00000000

000053C0: 00000000

000053C4: 00000000

000053C8: 00000000

000053CC: 00000000

000053D0: 00000000

000053D4: 00000000

000053D8: 0000103C

000053DC: 00000000

000053E0: 0000103C

000053E4: 00000001

000053E8: 0000103C

000053EC: 00000002

000053F0: 0000103C

000053F4: 00000003

000053F8: 00001008

000053FC: 00000004

00005400: 00000000

00005404: 00000000

00005408: 00000000

0000540C: 00000000

00005410: 00000000

00005414: 00000000

00005418: 00000000

0000541C: 00000000

00005420: 00000000

00005424: 00000000

00005428: 00000000

0000542C: 00000000

MemoryView3

00001000

Word Size

8Bit16Bit32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B

00001010 EF000011 E24DD008 E58DE000 E58D1004

00001020 E3510001 AA000002 E3A01001 E28DD008

00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

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RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000001
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (sl) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053e0
R14 (lr) : 0000103c
R15 (pc) : 00001040

CPSR Register

Negative (N) : 1

Zero (Z) : 0

Carry (C) : 0

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0

CPU Mode : System

0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into reg
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program ex

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

00005390: 00000000
00005394: 00000000
00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000001
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (sl) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053e0
R14 (lr) : 0000103c
R15 (pc) : 00001044

CPSR Register

Negative (N) : 1

Zero (Z) : 0

Carry (C) : 0

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0

CPU Mode : System

0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into reg
0000100C:EF00006B      SWI 0x6b      @ Print integer
00001010:EF000011      SWI 0x11      @ Stop program ex

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

00005390: 00000000
00005394: 00000000
00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000001
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053e0
R14 (lr) : 0000103c
R15 (pc) : 00001048

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register 0
0000100C:EF00006B      SWI 0x6b        @ Print integer 0
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

00005390: 00000000
00005394: 00000000
00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000

File View Cache Debug Watch Help

RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000001
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053e8
R14 (lr) : 0000103c
R15 (pc) : 0000104c

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer to console
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

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RegistersView

General Purpose
Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
R1 : 00000001
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053e8
R14 (lr) : 0000103c
R15 (pc) : 00001050

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000	E3A01004	EB000002	E3A00001	EF00006B
00001010	EF000011	E24DD008	E58DE000	E58D1004
00001020	E3510001	AA000002	E3A01001	E28DD008
00001030	E1A0F00E	E2411001	EBFFFFFF5	E1A02001

FileViewCacheDebugWatchHelp

RegistersView

General PurposeFloating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0: 00000000

R1: 00000001

R2: 00000001

R3: 00000000

R4: 00000000

R5: 00000000

R6: 00000000

R7: 00000000

R8: 00000000

R9: 00000000

R10 (s1): 00000000

R11 (fp): 00000000

R12 (ip): 00000000

R13 (sp): 000053e8

R14 (lr): 0000103c

R15 (pc): 0000103c

CPSR Register

Negative (N): 1

Zero (Z): 0

Carry (C): 0

Overflow (V): 0

IRQ Disable: 1

FIQ Disable: 1

Thumb (T): 0

CPU Mode: System

0x800000df

fact.s

00001000: main: mov r1, #4

00001000:E3A01004 bl fact

00001004:EB000002 MOV r0, #1 @ Load 1 into reg

00001008:E3A00001 SWI 0x6b @ Print integer

0000100C:EF00006B SWI 0x11 @ Stop program ex

00001010:EF000011

00001014:E24DD008 fact: sub sp, sp, #8

00001018:E58DE000 str lr, [sp,#0]

0000101C:E58D1004 str r1, [sp,#4]

00001020:E3510001 cmp r1,#1

00001024:AA000002 bge L1

00001028:E3A01001 mov r1, #1

0000102C:E28DD008 add sp, sp, #8

00001030:E1A0F00E mov pc, lr

00001034:E2411001 L1: sub r1, r1, #1

00001038:EBFFFFF5 BL fact

0000103C:E1A02001 mov r2, r1

00001040:E59D1004 ldr r1, [sp, #4]

00001044:E59DE000 ldr lr, [sp, #0]

00001048:E28DD008 add sp, sp, #8

0000104C:E0010192 mul r1, r2, r1

00001050:E1A0F00E mov pc, lr

StackView

00005398: 00000000

0000539C: 00000000

000053A0: 00000000

000053A4: 00000000

000053A8: 00000000

000053AC: 00000000

000053B0: 00000000

000053B4: 00000000

000053B8: 00000000

000053BC: 00000000

000053C0: 00000000

000053C4: 00000000

000053C8: 00000000

000053CC: 00000000

000053D0: 00000000

000053D4: 00000000

000053D8: 0000103C

000053DC: 00000000

000053E0: 0000103C

000053E4: 00000001

000053E8: 0000103C

000053EC: 00000002

000053F0: 0000103C

000053F4: 00000003

000053F8: 00001000

000053FC: 00000004

00005400: 00000000

00005404: 00000000

00005408: 00000000

0000540C: 00000000

00005410: 00000000

00005414: 00000000

00005418: 00000000

0000541C: 00000000

00005420: 00000000

00005424: 00000000

00005428: 00000000

0000542C: 00000000

00005430: 00000000

00005434: 00000000

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B

00001010 EF000011 E24DD008 E58DE000 E58D1004

00001020 E3510001 AA000002 E3A01001 E28DD008

00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000001
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1): 00000000
R11 (fp): 00000000
R12 (ip): 00000000
R13 (sp): 000053e8
R14 (lr): 0000103c
R15 (pc): 00001040

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

00005398: 00000000
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000053A4: 00000000
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000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
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00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000

File View Cache Debug Watch Help

RegistersView Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000002
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053e8
R14 (lr) : 0000103c
R15 (pc) : 00001044

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register 0
0000100C:EF00006B      SWI 0x6b        @ Print integer to console
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00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

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View
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Watch
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RegistersView

General Purpose

Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
R1 : 00000002
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053e8
R14 (lr) : 0000103c
R15 (pc) : 00001048

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

00005398: 00000000
0000539C: 00000000
000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

File
View
Cache
Debug
Watch
Help

RegistersView

General Purpose

Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000
R1 : 00000002
R2 : 00000001
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f0
R14 (lr) : 0000103c
R15 (pc) : 0000104c

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b        @ Print integer to console
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053A0: 00000000
000053A4: 00000000
000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000

MemoryView3

00001000

Word Size


8Bit

16Bit

32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

File View Cache Debug Watch Help

RegistersView  ×

General Purpose Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000

R1 : 00000002

R2 : 00000001

R3 : 00000000

R4 : 00000000

R5 : 00000000

R6 : 00000000

R7 : 00000000

R8 : 00000000

R9 : 00000000

R10 (s1) : 00000000

R11 (fp) : 00000000

R12 (ip) : 00000000

R13 (sp) : 000053f0

R14 (lr) : 0000103c

R15 (pc) : 00001050

CPSR Register

Negative (N) : 1

Zero (Z) : 0

Carry (C) : 0

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0


CPU Mode : System

0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

StackView  ×

000053A0: 00000000

000053A4: 00000000

000053A8: 00000000

000053AC: 00000000

000053B0: 00000000

000053B4: 00000000

000053B8: 00000000

000053BC: 00000000

000053C0: 00000000

000053C4: 00000000

000053C8: 00000000

000053CC: 00000000

000053D0: 00000000

000053D4: 00000000

000053D8: 0000103C

000053DC: 00000000

000053E0: 0000103C

000053E4: 00000001

000053E8: 0000103C

000053EC: 00000002

000053F0: 0000103C

000053F4: 00000003

000053F8: 00001008

000053FC: 00000004

00005400: 00000000

00005404: 00000000

00005408: 00000000

0000540C: 00000000

00005410: 00000000

00005414: 00000000

00005418: 00000000

0000541C: 00000000

00005420: 00000000

00005424: 00000000

00005428: 00000000


0000542C: 00000000

00005430: 00000000

00005434: 00000000

00005438: 00000000

0000543C: 00000000

MemoryView3  ×

Word Size 8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B

00001010 EF000011 E24DD008 E58DE000 E58D1004

00001020 E3510001 AA000002 E3A01001 E28DD008

00001030 E1A0F00E E2411001 EBFFFFFF5 E1A02001

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000003
R2 : 00000002
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f8
R14 (lr) : 0000103c
R15 (pc) : 0000104c

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into reg
0000100C:EF00006B      SWI 0x6b      @ Print integer
00001010:EF000011      SWI 0x11      @ Stop program ex

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

00001000 00001000

Word Size
8Bit 16Bit 32Bit

00001000	E3A01004	EB000002	E3A00001	EF00006B
00001010	EF000011	E24DD008	E58DE000	E58D1004
00001020	E3510001	AA000002	E3A01001	E28DD008
00001030	E1A0F00E	E2411001	EBFFFFF5	E1A02001

StackView

000053A8: 00000000
000053AC: 00000000
000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000006
R2 : 00000002
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 000053f8
R14 (lr) : 0000103c
R15 (pc) : 00001050

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into reg
0000100C:EF00006B      SWI 0x6b      @ Print integer :
00001010:EF000011      SWI 0x11      @ Stop program es

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

00001000

Word Size

8Bit

16Bit

32Bit

00001000	E3A01004	EB000002	E3A00001	EF00006B
00001010	EF000011	E24DD008	E58DE000	E58D1004
00001020	E3510001	AA000002	E3A01001	E28DD008
00001030	E1A0F00E	E2411001	EBFFFFF5	E1A02001

StackView

000053A8:00000000
000053AC:00000000
000053B0:00000000
000053B4:00000000
000053B8:00000000
000053BC:00000000
000053C0:00000000
000053C4:00000000
000053C8:00000000
000053CC:00000000
000053D0:00000000
000053D4:00000000
000053D8:0000103C
000053DC:00000000
000053E0:0000103C
000053E4:00000001
000053E8:0000103C
000053EC:00000002
000053F0:0000103C
000053F4:00000003
000053F8:00001006
000053FC:00000004
00005400:00000000
00005404:00000000
00005408:00000000
0000540C:00000000
00005410:00000000
00005414:00000000
00005418:00000000
0000541C:00000000
00005420:00000000
00005424:00000000
00005428:00000000
0000542C:00000000
00005430:00000000
00005434:00000000
00005438:00000000
0000543C:00000000
00005440:00000000
00005444:00000000

File View Cache Debug Watch Help

RegistersView

General Purpose Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000

R1 : 00000018

R2 : 00000006

R3 : 00000000

R4 : 00000000

R5 : 00000000

R6 : 00000000

R7 : 00000000

R8 : 00000000

R9 : 00000000

R10 (s1): 00000000

R11 (fp): 00000000

R12 (ip): 00000000

R13 (sp): 00005400

R14 (lr): 00001008

R15 (pc): 00001050

CPSR Register

Negative (N) : 1

Zero (Z) : 0

Carry (C) : 0

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0

CPU Mode : System

0x800000df

fact.s

```

00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register 0
0000100C:EF00006B      SWI 0x6b        @ Print integer to console
00001010:EF000011      SWI 0x11        @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr

```

StackView

000053B0: 00000000

000053B4: 00000000

000053B8: 00000000

000053BC: 00000000

000053C0: 00000000

000053C4: 00000000

000053C8: 00000000

000053CC: 00000000

000053D0: 00000000

000053D4: 00000000

000053D8: 0000103C

000053DC: 00000000

000053E0: 0000103C

000053E4: 00000001

000053E8: 0000103C

000053EC: 00000002

000053F0: 0000103C

000053F4: 00000003

000053F8: 00001008

000053FC: 00000004

00005400: 00000000

00005404: 00000000

00005408: 00000000

0000540C: 00000000

00005410: 00000000

00005414: 00000000

00005418: 00000000

0000541C: 00000000

00005420: 00000000

00005424: 00000000

00005428: 00000000

0000542C: 00000000

00005430: 00000000

00005434: 00000000

00005438: 00000000

0000543C: 00000000

00005440: 00000000

00005444: 00000000

00005448: 00000000

0000544C: 00000000

MemoryView3

Word Size 8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B

00001010 EF000011 E24DD008 E58DE000 E58D1004

00001020 E3510001 AA000002 E3A01001 E28DD008

00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000000
R1 : 00000018
R2 : 00000006
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1): 00000000
R11 (fp): 00000000
R12 (ip): 00000000
R13 (sp): 00005400
R14 (lr): 00001008
R15 (pc): 00001008

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System

0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000
00005448: 00000000
0000544C: 00000000

File View Cache Debug Watch Help



RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 00000001
R1 : 00000018
R2 : 00000006
R3 : 00000000
R4 : 00000000
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 00005400
R14 (lr) : 00001008
R15 (pc) : 0000100c

CPSR Register
Negative (N) : 1
Zero (Z) : 0
Carry (C) : 0
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System
0x800000df

fact.s

```
00001000:      main:
00001000:E3A01004      mov r1, #4
00001004:EB000002      bl fact
00001008:E3A00001      MOV r0, #1      @ Load 1 into register
0000100C:EF00006B      SWI 0x6b      @ Print integer to console
00001010:EF000011      SWI 0x11      @ Stop program execution

00001014:E24DD008      fact: sub sp, sp, #8
00001018:E58DE000      str lr, [sp,#0]
0000101C:E58D1004      str r1, [sp,#4]
00001020:E3510001      cmp r1,#1
00001024:AA000002      bge L1
00001028:E3A01001      mov r1, #1
0000102C:E28DD008      add sp, sp, #8
00001030:E1A0F00E      mov pc, lr
00001034:E2411001      L1: sub r1, r1, #1
00001038:EBFFFFF5      BL fact
0000103C:E1A02001      mov r2, r1
00001040:E59D1004      ldr r1, [sp, #4]
00001044:E59DE000      ldr lr, [sp, #0]
00001048:E28DD008      add sp, sp, #8
0000104C:E0010192      mul r1, r2, r1
00001050:E1A0F00E      mov pc, lr
```

MemoryView3

Word Size
8Bit 16Bit 32Bit

00001000 E3A01004 EB000002 E3A00001 EF00006B
00001010 EF000011 E24DD008 E58DE000 E58D1004
00001020 E3510001 AA000002 E3A01001 E28DD008
00001030 E1A0F00E E2411001 EBFFFFF5 E1A02001

StackView

000053B0: 00000000
000053B4: 00000000
000053B8: 00000000
000053BC: 00000000
000053C0: 00000000
000053C4: 00000000
000053C8: 00000000
000053CC: 00000000
000053D0: 00000000
000053D4: 00000000
000053D8: 0000103C
000053DC: 00000000
000053E0: 0000103C
000053E4: 00000001
000053E8: 0000103C
000053EC: 00000002
000053F0: 0000103C
000053F4: 00000003
000053F8: 00001008
000053FC: 00000004
00005400: 00000000
00005404: 00000000
00005408: 00000000
0000540C: 00000000
00005410: 00000000
00005414: 00000000
00005418: 00000000
0000541C: 00000000
00005420: 00000000
00005424: 00000000
00005428: 00000000
0000542C: 00000000
00005430: 00000000
00005434: 00000000
00005438: 00000000
0000543C: 00000000
00005440: 00000000
00005444: 00000000
00005448: 00000000
0000544C: 00000000

FileViewCacheDebugWatchHelp

RegistersView

General PurposeFloating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0:00000001

R1:00000018

R2:00000006

R3:00000000

R4:00000000

R5:00000000

R6:00000000

R7:00000000

R8:00000000

R9:00000000

R10(s1):00000000

R11(fp):00000000

R12(ip):00000000

R13(sp):00005400

R14(lr):00001008

R15(pc):00001010

CPSR Register

Negative(N):1

Zero(Z):0

Carry(C):0

Overflow(V):0

IRQ Disable:1

FIQ Disable:1

Thumb(T):0

CPU Mode:System

0x800000df

fact.s

00001000:main:mov r1, #4

00001004:EB000002bl fact

00001008:E3A00001MOV r0, #1 @ Load 1 into register

0000100C:EF00006BSWI 0x6b @ Print integer

00001010:EF000011SWI 0x11 @ Stop program execution

00001014:E24DD008fact:sub sp, sp, #8

00001018:E58DE000str lr, [sp,#0]

0000101C:E58D1004str r1, [sp,#4]

00001020:E3510001cmp r1,#1

00001024:AA000002bge L1

00001028:E3A01001mov r1, #1

0000102C:E28DD008add sp, sp, #8

00001030:E1A0F00Emov pc, lr

00001034:E2411001L1:sub r1, r1, #1

00001038:EBFFFFF5BL fact

0000103C:E1A02001mov r2, r1

00001040:E59D1004ldr r1, [sp, #4]

00001044:E59DE000ldr lr, [sp, #0]

00001048:E28DD008add sp, sp, #8

0000104C:E0010192mul r1, r2, r1

00001050:E1A0F00Emov pc, lr

StackView

000053B0:00000000

000053B4:00000000

000053B8:00000000

000053BC:00000000

000053C0:00000000

000053C4:00000000

000053C8:00000000

000053CC:00000000

000053D0:00000000

000053D4:00000000

000053D8:0000103C

000053DC:00000000

000053E0:0000103C

000053E4:00000001

000053E8:0000103C

000053EC:00000002

000053F0:0000103C

000053F4:00000003

000053F8:00001008

000053FC:00000004

00005400:00000000

00005404:00000000

00005408:00000000

0000540C:00000000

00005410:00000000

00005414:00000000

00005418:00000000

0000541C:00000000

00005420:00000000

00005424:00000000

00005428:00000000

0000542C:00000000

00005430:00000000

00005434:00000000

00005438:00000000

0000543C:00000000

00005440:00000000

00005444:00000000

00005448:00000000

0000544C:00000000

MemoryView3

00001000

Word Size8Bit16Bit32Bit

00001000E3A01004EB000002E3A00001EF00006B

00001010EF000011E24DD008E58DE000E58D1004

00001020E3510001AA000002E3A01001E28DD008

00001030E1A0F00EE2411001EBFFFFF5E1A02001

ARM assembly program

label	operation	operand	comments
main:			
	LDR	R1, value	@ load value
	STR	R1, result	
	SWI	#11	
value:	.word	0x0000C123	
result:	.word	0	

“Normal” Assembler

```
gcd    cmp r0, r1      ;reached the end?
        beq stop
        blt less       ;if r0 > r1
        sub r0, r0, r1  ;subtract r1 from r0
        bal gcd
less   sub r1, r1, r0    ;subtract r0 from r1
        bal gcd
stop
```

```
while (a!=b) {
    if (a > b) {
        a = a - b;
    } else {
        b = b - a;
    }
}
return a;
```

ARM Conditional Assembler

```
gcd    cmp    r0, r1      ;if r0 > r1
        subgt r0, r0, r1  ;subtract r1 from r0
        sublt r1, r1, r0  ;else subtract r0 from r1
        bne   gcd         ;reached the end?
```