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Lab 4 3/5/2025

• Data processing format: ADD, SUB, MOV

• Load/store instructions: LDR, STR

• Branch instructions: B, BL

MOV R10, R1

Data Processing

Cond | $\overset{op}{\text{Op}}$ | I | Opcode | S | Rn | Rd | Operand2

1110 | 00 | 0 | 1101 | 0 | 0000 | 1010 | 0000 0000
E | 0000 | 0001 | R1 | 0 | A | 0 | 0 | 0

0 | R1 |

To hex

0A0001

[0xE1A0A001]

Lab 4 Continued

2 ADD R5, R3, R2

Data processing

Cond	op	I	CMD	S	Rn	Rd	Shamt5 sh10 Rm
1110	100	0	ADD	0000	01	0011 0101 0000	0010
E	O						
1110	0000	1000	0011	0101	0000 0000 0000	0010	↓ 2 no shift So just zeroes
E	O	8	3	5	0 0	2	

Finally,

10xE0835002

3. LDR R2,[R10,#4] Load / store instructions

Base address = R10 Offset = 4

Address = (R10+4)

Cond	op	T	P	U	B	W	L	Rn	Rd	Shamt5 sh10 Rm
1110	01	0	1	1	0	0	1	1010	0010 0000 0000	0100
E	5	9	A	2	0	0	4			

1110	0101	1001	1010	0010	0000 0000	0100
E	5	9	A	2	0	4

10xE59A2004

CMP R5, R2

Data Processing

Cond | op | T | cmd | S | Rn | Rd | Src2

01100000	001010	10101	00000	...	0010
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1110 0001 0101 0101 0000 0000 0000 0010

5 1 5 5 0 0 0 2

LOx E1 550002

BLT ELSE

Branch Instruction Format

Target address = 0x000000014

$$PC + 8 = 0x0000000010 + 8 = 0x0000000018$$

$$\underline{0x00000014 - 0x000\ 00018} = \text{-1}^{\text{r offset}}$$

cond op offset

B B F F F F F L

0xBFFFFFFF

SUBS R5, R5, #1 Data processing

cond op I cmd S Rn Rd

R5 R5

1110 00 | 0010 | 0101 0101 0000 0000 0001

1110 0010 0101 0101 0101 0000 0000 0001
E 2 5 5 5 0 0 1

0xE2555001

BNE FUNC2

Target address: 0x00000008

PC: 0x00000018

$$0x00000018 + 8 = 0x00000020$$

$$0x00000008 - 0x00000020 = -0x18 \rightarrow \frac{-24}{4} = -6$$

Cond Op L offset

0001 10 10 1111 1111 1111 1111 1010 0110
| A F F F F F A 1010

0x1AFFFFFFA