

EECS 20 Lab 2

**Part I:**

(a) 0110001100001110

**Operation:** LDR

**DR:** R1 (001)

**SR1:** N/A

**SR2:** N/A

**Imm5:** N/A

**BaseR:** R4 (100)

**Offset6:**  $2^3 + 2^2 + 2^1 = 14$

(b) 0001001011000100

**Operation:** ADD

**DR:** R1 (001)

**SR1:** R3 (011)

**SR2:** R4 (100)

**Imm5:** N/A

(c) 0011101000011101

**Operation:** ST

**DR:** N/A

**SR1:** N/A

**SR2:** N/A

**Imm5:** N/A

**SR:** R5 (101)

**PCOffset9:**  $2^4 + 2^3 + 2^2 + 2^0 = 29$

(d) 0010010000101001

**Operation:** LD

**DR:** R2 (010)

**SR1:** N/A

**SR2:** N/A

**Imm5:** N/A

**PCOffset9:**  $2^5 + 2^3 + 2^0 = 41$

**(e)** 0001101010100011

**Operation:** ADD

**DR:** R5 (101)

**SR1:** R2 (010)

**SR2:** N/A

**Imm5:**  $2^1 + 2^0 = 3$

**(f)** 1100000011000000

**Operation:** JMP

**DR:** N/A

**SR1:** N/A

**SR2:** N/A

**Imm5:** N/A

**BaseR:** R3 (011)

**Part II:**

**NOT:** 1001

**ADD:** 0001

**AND:** 0101

**RET:** 1100

**JSR:** 0100

**JMP:** 1100

**Part III:**

### Code:

```
.ORIG x4000

AND R0, R0, #0

AND R1, R1, #0

AND R2, R2, #0

AND R3, R3, #0

AND R4, R4, #0

AND R5, R5, #0


ADD R1, R1, #1

ADD R2, R2, #2

ADD R3, R3, #3

ADD R4, R4, #4

ADD R5, R5, #5

ADD R0, R1, R2

ADD R0, R0, R3

ADD R0, R0, R4

ADD R0, R0, R5

TRAP x25

.END
```

### Pseudo-Code:

- Initialize *R0* with the value of zero.
- Initialize *R1* with the value of zero.
- Initialize *R2* with the value of zero.
- Initialize *R3* with the value of zero.
- Initialize *R4* with the value of zero.
- Initialize *R5* with the value of zero.
- Load *R1* with the value of 1.
- Load *R2* with the value of 2.
- Load *R3* with the value of 3.
- Load *R4* with the value of 4.
- Load *R5* with the value of 5.

- Load *R0* with the sum of *R1* and *R2*.
- Load *R0* with the sum of previous value of *R0* and *R3*.
- Load *R0* with the sum of previous value of *R0* and *R4*.
- Load *R0* with the sum of previous value of *R0* and *R5*.

Result:

R0	x000F	15	R4	x0004	4	PC	x400F	16399
R1	x0001	1	R5	x0005	5	IR	x1005	4101
R2	x0002	2	R6	x0000	0	PSR	x8001	-32767
R3	x0003	3	R7	xFD75	-651	CC	P	