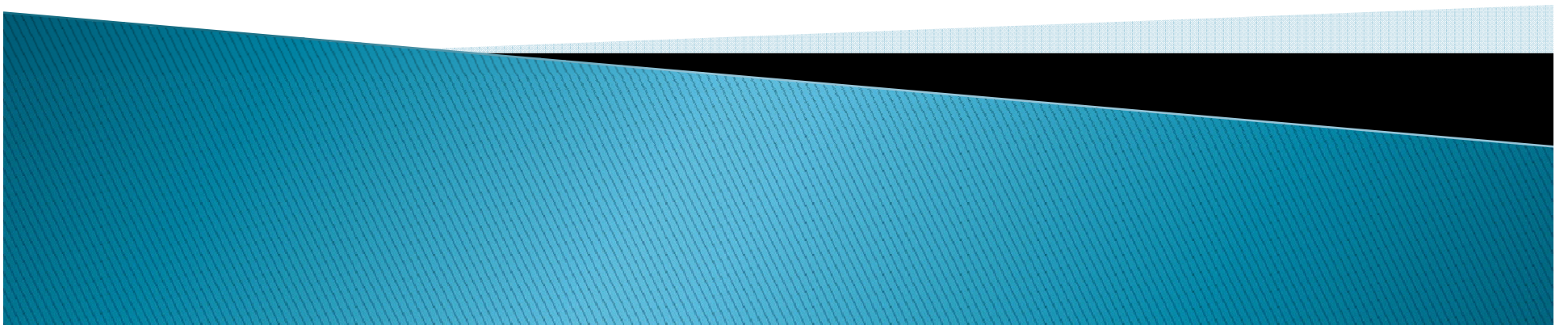


Assignment 3 hints

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Computer Science 210



Assignment 3 request

- ▶ Try not to use external library except iostream and string

A typical run of the application would be:

```
./a.out 000A 5EAA E1DE 1EBD C1C0
```

```
./a.out 000A 5EAA E1DE 1EBD C1C0
```

which should print to the standard output the lines

```
000A: BR      a
5EAA: AND     R7, R2, #10
E1DE: LEA     R0, fffffffde
1EBD: ADD     R7, R2, #-3
C1C0: RET
```

```
000A: BR      a
5EAA: AND     R7, R2, #10
E1DE: LEA     R0, fffffffde
1EBD: ADD     R7, R2, #-3
C1C0: RET
```

(and nothing else).

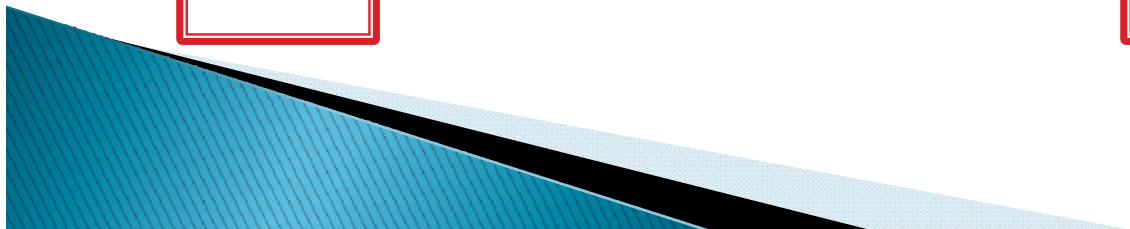
Some more sample runs of the program are shown below.

```
sman063@login01% ./a.out 48DC
48DC: JSR     220
sman063@login01% ./a.out C180 F023
C180: JMP     R6
F023: TRAP   23
```

To handle all operations

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
ADD ⁺	0001				DR			SR1			0	00		SR2		
ADD ⁺	0001				DR			SR1			1	imm5				
AND ⁺	0101				DR			SR1			0	00		SR2		
AND ⁺	0101				DR			SR1			1	imm5				
BR	0000				n	z	p	PCoffset9								
JMP	1100				000			BaseR			000000					
JSR	0100				1	PCoffset11										
JSRR	0100				0	00		BaseR			000000					
LD ⁺	0010				DR			PCoffset9								

LDI ⁺	1010				DR			PCoffset9								
LDR ⁺	0110				DR			BaseR			offset6					
LEA ⁺	1110				DR			PCoffset9								
NOT ⁺	1001				DR			SR			111111					
RET	1100				000			111			000000					
RTI	1000				000000000000											
ST	0011				SR			PCoffset9								
STI	1011				SR			PCoffset9								
STR	0111				SR			BaseR			offset6					
TRAP	1111				0000			trapvect8								



What is wanted?

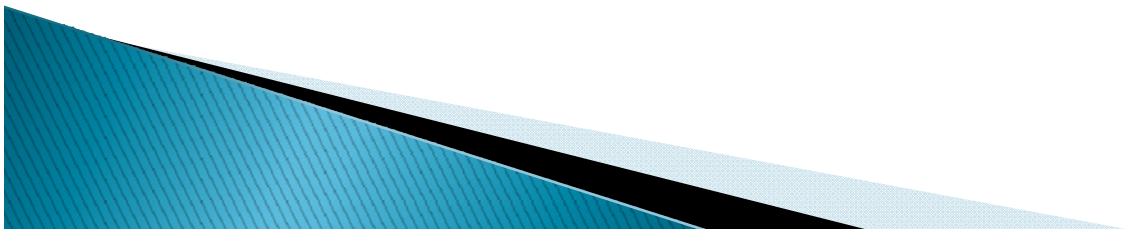
```
./a.out 000A 5EAA E1DE 1EBD C1C0
```

- ▶ Inputs as an array of arguments
- ▶ Each is an 16 bit binary
- ▶ 000A = 0000 0000 0000 1010
 - Opcode = 0000 = BR
 - Offset = 1010 = a
- ▶ 5EAA = 0101 1110 1010 1010
 - Opcode = 0101 = AND
 - DR = 111 = 7 = R7
 - SR = 010 = 2 = R2
 - Fifth bit = 1 -> next is imm5 value
 - imm5 value = 01010 = #10

```
000A: BR      a
5EAA: AND    R7, R2, #10
E1DE: LEA    R0, fffffffde
1EBD: ADD    R7, R2, #-3
C1C0: RET
```


Start from assignment template

- ▶ Allow inputs from arguments and print each argument out line by line.
- ▶ What is missing?
 - Convert each string (5EAA) to integer
 - Find 4bit opcode (use shift right?).
 - Compare with the instruction set and find the next bits (use shift?).
 - Print out the instruction
- ▶ Start early... it worth 10% of the whole course.



Sample outputs: output.txt

▶ 0E52:BRnzp	52	▶ 0404:BRz	4
▶ 0050:BR	50	▶ F021:TRAP	21
▶ E1AD:LEA	R0, fffffffad	▶ 7080:STR	R0, R2, #0
▶ F022:TRAP	22	▶ 14A1:ADD	R2, R2, #1
▶ E4AC:LEA	R2, ac	▶ 0FF9:BRnzp	fffffff9
▶ F020:TRAP	20	▶ 20C0:LD	R0, c0
▶ 1236:ADD	R1, R0, #-10	▶ F021:TRAP	21
▶ 0404:BRz	4	▶ E1CE:LEA	R0, fffffffce
▶ F021:TRAP	21	▶ F022:TRAP	22
▶ 7080:STR	R0, R2, #0	▶ E4D6:LEA	R2, d6
▶ 14A1:ADD	R2, R2, #1	▶ F020:TRAP	20
▶ 0FF9:BRnzp	fffffff9	▶ 1236:ADD	R1, R0, #-10
▶ 20CC:LD	R0, cc	▶ 0404:BRz	4
▶ F021:TRAP	21	▶ F021:TRAP	21
▶ E1BD:LEA	R0, fffffffbd	▶ 7080:STR	R0, R2, #0
▶ F022:TRAP	22	▶ 14A1:ADD	R2, R2, #1
▶ E4B4:LEA	R2, b4	▶ 0FF9:BRnzp	fffffff9
▶ F020:TRAP	20	▶ 5260:AND	R1, R1, #0
▶ 1236:ADD	R1, R0, #-10	▶ 1263:ADD	R1, R1, #3



Any questions?

- ▶ Good luck!!!

