

ONLINE QUIZ
AY2019/2020 Semester 2
CS2100 — COMPUTER ORGANISATION
11 March 2020
ANSWER SHEET

Total mark

/40

Question 0: Personal Particulars

[1 mark]

Student Number

Tutorial Grp

A

Question 1: Warmup Questions

[8 marks]

a)

ADD \$1, \$2, \$2, 0

[2 marks]

b)

XOR \$1, \$2, \$7, 0 (can swap \$2 and \$7)

or

SUB \$1, \$0, \$2, 1 (by property of 2s complement)

[2 marks]

c)

ADD \$1, \$2, \$3, -3

[2 marks]

d)

ADD \$1, \$2, \$0, -2

or

SUB \$1, \$2, \$0, 2

[2 marks]

Question 2: Compilation

[8 marks]

```

ADD $1, $0, $0, 0    # sum = 0
ADD $2, $0, $0, 0    # i = 0
loop: BEQ $1, $0, cont # while (sum == 0) continue
      BEQ $0, $0, end  # otherwise, end

```

```

cont: ADD $4, $2, $2, 0    # array element is 2 bytes, so 2i
      ADD $4, $4, $3, 0    # $4 = addr of x[i]
      LW  $5, $4, 0        # $5 = x[i]
      BEQ $5, $0, case0    # switch(x[i]) --> case 0:
      BEQ $5, $7, case1    # switch(x[i]) --> case -1:
      BEQ $0, $0, def       # switch(x[i]) --> default:
case0: SW  $7, $4, 0        # x[i] = -1
case1: BEQ $0, $0, break    # break
def:   ADD $1, $5, $2, 5    # sum = x[i] + i + 5
      ADD $2, $2, $0, 1    # i = i + 1

```

```

break: BEQ $0, $0, loop    # goto loop
end:

```

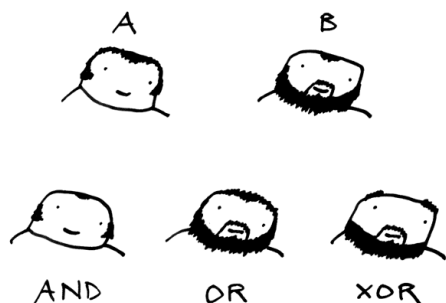
Question 3: Encoding**[14 marks]**

a)	Hexadecimal	SIMP	
	0x402F	SUB \$2, \$0, \$0, -1	[2 marks]
	0x2920	L: ADD \$2, \$2, \$2, 0	[2 marks]
	0x241F	ADD \$1, \$1, \$0, -1	[2 marks]
	0xE08A	BEQ \$0, \$1, E	[2 marks]
	0xE482	BEQ \$1, \$1, L	[2 marks]
		E:	

- b) (i) **15 (7+8)** [2 marks] (ii) **8 (7+1)** [2 marks]

Question 4: Datapath and Control**[9 marks]**

a)	sign extend								[1 mark]
b)	0x0000 (since LW/SW need to do \$rs + 0 + const, which is OP1 + 0 + OP2)								[1 mark]
c)	RR1	RR2	WR	OP1	OP2	OP3	addr	MWD	[7 marks]
	\$4	\$5	\$3	R[\$4]	R[\$5]	0	R[\$4] - R[\$5] - 0 or R[\$4] - R[\$5]	R[\$5]	

Feedback: this will not affect your marks in any way**BOOLEAN HAIR LOGIC****Do you have any comment/feedback about the module?**