

HW1. Y86-64 Encoding and Decoding

due: 2019.09.30.

Please write the answers for the following questions. Students should provide detailed explanations for the answers.

byte:	0	1	2	3	4	5	6	7	8	9
halt	0	0								
nop	1	0								
rrmovq/cmovCC rA, rB	2	cc	rA	rB						
irmovq V, rB	3	0	F	rB					V	
rmmovq rA, D(rB)	4	0	rA	rB					D	
mrmmovq D(rB), rA	5	0	rA	rB					D	
OPq rA, rB	6	fn	rA	rB						
jCC Dest	7	cc							Dest	
call Dest	8	0							Dest	
ret	9	0								
pushq rA	A	0	rA	F						
popq rA	B	0	rA	F						

1. Y86-64 encoding (20 points)

Convert the following Y86-64 assembly codes into binaries. Refer to the Y86-64 specification from the above figure and our textbook.

```
irmovq $1, %rax
addq %rdi, %rax
ret
```

2. Y86-64 encoding (20 points)

Convert the following Y86-64 assembly codes into binaries. Refer to the Y86-64 specification from the above figure and our textbook.

```
comeOn:          /* suppose at address 0x123 */
    addq %rax, %rax
    jge comeOn
```

3. Y86-64 decoding (60 points)

Convert the following object codes (binaries) into the corresponding Y86-64 assembly codes. Refer to the Y86-64 specification from the above figure and our textbook.

```
20 10 60 20 61 37 72 84 00 00 00 00 00 00 00
20 12 20 01 70 68 00 00 00 00 00 00 00 00
```