# ICS Homework Week 7

October 25, 2022

## 1 Addressing Mode

Assuming we have the following initial state of registers and memory:

| Memory Address | Value | Register | Value |
|---|---|---|---|
| 0x10 | 0x20 | %rax | 0x10 |
| 0x20 | 0x25 | %rbx | 0x24 |
| 0x21 | 0x10 | %rcx | 0x1 |
| 0x22 | 0x26 | %rdx | 0x20 |
| 0x23 | 0x21 | | |
| 0x24 | 0x24 | | |

Please fill in the table(in **hexadecimal**)(Memory access will load one byte)

| Opreand | Value |
|---|---|
| %rax | 0x10 |
| (%rax) | 0x20 |
| 0x21 | 0x10 |
| $0x21 | 0x21 |
| 0x20(%rcx) | 0x10 |
| 0x20(,%rcx,2) | 0x26 |
| (%rdx,%rcx) | 0x10 |
| 0x10(%rax,%rcx,4) | 0x24 |

## 2 Data moving

Assuming we have the following initial state of registers and memory:

| Memory Address | Value | Register | Value |
|---|---|---|---|
| 0x20 | 0xDE | %r8 | 0xF0F1F2F3 |
| 0x21 | 0xAD | %r9 | 0x22 |
| 0x22 | 0xBE | %r10 | 0x1 |
| 0x23 | 0xEF | %r11 | 0x11223344556677 |
| 0x24 | 0x12 | %rcx | 0x0 |
| 0x25 | 0x34 | | |
| 0x26 | 0x56 | | |
| 0x27 | 0x78 | | |

We execute the following assembly codes.

```
1       movl            (%r9, %r10, 2), %ecx
2       movw            $-1, %r11w
3       movl            $-1, %r11d
4       movabsq         $-1, %r11
5       movq            $-1, %r11
6       movsbl          %r8b, %ecx
7       movzbl          %r8b, %ecx
```

Please fill the table which shows the state **after** each instruction being executed (In **hexadecimal**) (Please write "——" if the register or memory will not change):

| Instructions | %rcx | %r11 |
|---|---|---|
| movl | 0x78563412 | – |
| movw | – | 0x1122334455ffff |
| movl | – | 0xffffffff |
| movabsq | – | 0xffffffffffffff |
| movq | – | 0xffffffffffffff |
| movsbl | 0xfffffff3 | – |
| movzbl | 0xf3 | – |