

Solution

Problem 1: (14 points)

```
[1] 0011          [2] 0011 0001      [3] 1111 1111
[4] 1101          [5] 0010          [6] 1111 0011
[7] 0001 0000
```

Problem 2: (12 points)

```
[1] 0x7e2
[2] 0x1020300
[3] 0x7fffffff
[4] 0xefcdab00
[5] 0x1
[6] 0x44332211ffffffff
[7] 0x2018
[8] 0x201a
[9] 0xffffffff ffffffff
[10] 0x2028
[11] 0x1
[12] 0x00000000 00002030
```

Problem 3: (16 points)

```
1. [1] 0          [2] 8
   [3] 48          [4] 0x555555755050
   [5] 0x555555755068 [6] 0x555555755060
   [7] 0x555555755060 [8] 0x555555755040

2. 48 - (0+1+8*3+1+8) = 14

3. [1] 8          [2] 34
   [3] 0x555555755049 [4] 0x55555575505a
```

Problem 4: (16 points)

```
1. [1] 1023          [2] 1 1111111111 0000
   [3] 0 0000000000 1111 [4] 0 0000000001 0000

2. 1 10000000011 1010

3. 1 10000001110 0000
```

Problem 5: (22 points)

```
1 [1] 0x802018+ 8*(5*i + j)
```

```

[2] 0x802068
[3] 1
[4] 0
[5] 2
2 [1] 5 [2] 3
[3] 5 [4] a < 4 ?result-a: a-result ;
[5] .L2 [6] -16(%rbp)
[7] *%rdx [8] .L13
[9] sarq [10] movq -24(%rbp), %rax / nop
3 -2

```

Problem 6: (20 points)

```

1 [1] 400523 [2] mov %rdx,%rsi
[3] mov %rax,%rdi [4] add %rbx,%rax
[5] add $0x18,$rsp [6] pop %rbx
[7] pop %rbp / leaveq [8] sub $0x40,%rsp
2 40
3 a. between 0 (2') and 37 (2')
b. x = 46 ret addr = 0x400500
x = 47 ret addr = 0x400000
x = 55 ret addr = 0x101512
x = 56 ret addr = 0x10151200
x = 57 ret addr = 0x101512000c
x = 58 ret addr = 0x101512000c11
x = 75 ret addr = 0x502004005be

```