Ben Paine
Homework 4

1. 3.58

```
long decode2(long x, long y, long z) {
     long result;

     y -= z;
     x *= y;
     result = x;
     result <<= 63;
     result >>= 63;
     result ^= x;

     return result;
}
```

2. 3.60
   a. x = %rdi, n = %esi, result = %rax, mask = %rdx
   b. Result = 0, mask = 1
   c. If mask is not equal to zero
   d. %rdx holds the value of mask, mask gets updated each time %rdx is left shifted
   e. Result is updated when = andq %rdx, %r8 ; x = mask & x, orq %r8, %rax ; result = x | result
   f.

```
long loop(long x, long n) {
     long result = 0
     long mask;
     for (mask = 1; mask != 0; mask <<= n) {
          result |= mask & x;
     }
     return result;
}
```

3. 3.65
   a. %rcx
   b. %rsi
   c. 1

4. 3.66
   a. NR = (3 * (v))
   b. NC = (4 * (v) + 1)

5. 3.67
   a. Stack diagram:
      %rsp + 32 —> z
      %rsp + 24 —> &z
      %rsp + 16 —> y
      %rsp + 8 —> x

   b. %rsp pointer
   c. Process uses the %rsp pointer and its offsets to access the values in strA s
   d. s.a is stored in %rcx and the values stored in %rdx are moved into the %rdi registers
   e. %rsp + 88 -> z
      %rsp + 80 -> x
      %rsp + 72 -> y
   f. Passing in a structure as an argument copies all of its members which ends up taking more space into the stack

6. 3.68
   a. A = 9
   b. B = 5