

Group Problem Set #3

1. Describe how you could experimentally determine the amount of memory allocated to a program.
2. Here is a traditional recursive solution to compute x^n

```
double power(double x, int n)
{
    If (n == 0)
        return 1;
    return n * power(x, n-1);
}
```

However, is it really necessary to make eight multiplications to compute x^8 ?

It can be observed that:

$$x^8 = (x^4) * (x^4)$$

$$x^4 = (x^2) * (x^2)$$

$$x^2 = x * x$$

That is, only 3 multiplications are needed. Using this observation, improve the recursive algorithm for computing x^n . Hint: A separate case is needed for odd exponents.