

Chapter 7 programming

7.21:

```
public static int ackermanFunction(int m, int n) {  
    if(m == 0) {  
        return n+1;  
    }  
    else if(m > 0 && n == 0) {  
        return ackermanFunction(m-1, 1);  
    }  
    else {  
        return ackermanFunction(m-1, ackermanFunction(m, n-1));  
    }  
}
```

Did the base cases then the recursion

7.23:

```
public static int count(int N) {  
    int num;  
    if(N==0) {  
        num = 0;  
        return num;  
    }  
    else if(N % 2==0){  
        num = count(N/2);  
        return num;  
    }  
    else {  
        num = 1+ count((N-1)/2);  
        return num;  
    }  
}
```

did the base cases and then the else for the recursion statement.

7.36:

```
public static void reverse(Scanner sc) {  
    String str = sc.nextLine();  
    if(str.length() > 0) {  
        reverse(sc);  
        System.out.println(str);  
    }  
    else {  
        sc.close();  
        return ;  
    }  
}
```

Made my base statements and then the recursion statements. Also print out the string.

7.30: Extra credit

```
public static List allSums(int[] arr, int s, int e, int sum, LinkedList list) {  
    if(s > e) {  
        list.add(sum);  
        return list;  
    }  
    allSums(arr, s+1, e, sum+arr[s], list);  
    allSums(arr, s+1, e, sum, list);  
    return list;  
}
```

Make my base statement then two different recursion statements