Unit 10 Review 2

Name: Key 3/28/22

1. What has to be true about a data set before you can use a binary search algorithm on with it?

it must be sorted

2. What is wrong with the following recursive method?

```
public static int doit(int a)
 {
   return a + doit(a-1);
 }
```

it does not have a base case

3. What is printed by the call review(1)?

```
public static void review(int a)
 {
   if(a<7)
     review(a+3);
   System.out.print(a+" ");
}
```

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7_4_1_

4. What is printed by the call review(8)?

```
public static void review(int a)
 {
   System.out.print(a+" ");
   if(a<10)
     review(a+1);
 }
```

8_9_10_

5. What is returned by the call review(10)?

```
public static int review(int a)
 {
   if(a>15)
     return 1;
   return a + review(a+3);
 }
```

10 + 13 + 1 = 24

6. What is returned by the call review(10)?

```
public static int review(int a)
 {
   if(a==8)
     return 1;
   return a * review(a-1);
 }
```

10 · 9 · 1 = 90

5. Write a recursive method **changeOX** which returns a given String with any occurrence of the letters "ox" replaced with an "oo". So "xbox" returns "xboo".

```
public static String changeOX(String str)
{
  if(str.length()<2) return str;
  if(str.substring(0,2).equals("ox"))
     return "oo" + changeOX(str.substring(2));
  return str.substring(0,1) + changeOX(str.substring(1));
}
```

6. Write a recursive method **addDigitsExcept7s** which returns the sum of all the digits in a number of any length except that it skips any 7s. So sending 127 returns 3, and sending 1024 returns, ironically, 7.

```
public static int addDigitsExcept7(int n)
{
 if(n==0) return 0;
 if(n%10!=7) return n%10 + addDigitsExcept7(n/10);
 return addDigitsExcept7(n/10);


}
```

7. The following questions deal with this array and a binary search algorithm.

```
int[] array = { 1, 3, 7, 10, 13, 16, 19, 22, 25 };
              0  1  2  3  4  5  6  7  8
```

Which is the first value (value, not index) checked when a binary search algorithm is used to search this array for 12? $(0+8)/2 = 4$ 13 (index 4)

What is the second value checked? $(0+3)/2 = 1$ 3 (index 1)

What is the third value checked? $(2+3)/2 = 2$ 7 (index 2)

What is the fourth value checked? $(3+3)/2 = 3$ 10 (index 3)

What is the final result returned? -1

8. Write a recursive method that adds all the integers from 1 up to the integer sent in (assume the parameter is greater than 1). So sending in 3 returns 6 (1 + 2 + 3) and sending in 4 returns 10.

```
public static int addEmUp(int n)
{
if(n==0) return 0;
return n + addEmUp(n-1);


}
```

9. Write a recursive method that adds all the integers divisible by 3 from 3 up to the integer sent in (assume the parameter is greater than 3). So sending in 6 returns 9 (3 + 6) and sending in 17 returns 45 (3 + 6 + 9 + 12 + 15)

```
public static int iHeart3s(int n)
{
if(n==0) return 0;
if(n%3==0) return n + iHeart3s(n-1);
return iHeart3s(n-1);


}
```

10. How many times will this code print "Hi" if you call sayHi(5) ?

```
public static void sayHi(int n)
  {
    if(n>3) sayHi(n-1);
    System.out.println("Hi");
  }
```

5 4 3 3 times