

```

1. public int mystery(int k, int n)
   {
     if (n==k)
       return k;
     else if (n > k)
       return mystery(k, n-k);
     else
       return mystery(k-n, n);
   }

```

k 6 n 8
 |
 k 6 n 2
 |
 k 4 n 2
 |
 k 2 n 2

Based on the method defined above, what is the value of `mystery(6,8)`?

- a) 1
- b) 2**
- c) 3
- d) 4
- e) 8

2. Given the following method:

```

public int F (int x)
{
  if ((x == 1) || (x==3))
    return x;
  else
    return x * F(x-1);
}

```

x 2 (2)
 return 2 * 1
 ↓
 x 1

x 5 (5·4·3)
 return 5 *
 ↓
 x 4
 return 4 * 8
 ↓
 x 3

Consider invoking F with the following statement:

```
int z = F( F(2) + F(5) );
```

F(62)

If the `int` data type were large enough (had enough bytes) to allow the program above to be executed, the end of the program, the value of `z` would be

- a) 62
- b) $5! + 2!$
- c) $(5! + 2)!$
- d) $(7!)!$
- e) $(62!) / (2!)$**

Questions 3-4 refer to the following method.

```
public int whatIsIt (int x, int n)
{
    if ( n == 1 )
        return x;
    else
        return x * whatIsIt(x, n-1);
}
```

3. What is the value returned by **whatIsIt**(4, 4)?

- a) 8
- b) 16
- c) 24
- d) 64
- e) 256

x 4 n 4
return ~~4~~* 4*4*4
↓
x 4 n 3
return 4* 4*4
↓
x 4 n 2
return 4* 4
↓
x 4 n 1

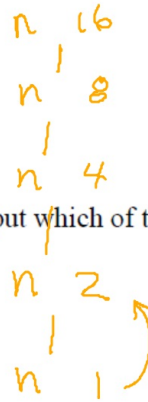
4. Which of the following is a necessary and sufficient condition for the method **whatIsIt** to return a value assumed that the values of n and x are small in magnitude?

- a) $n > 0$
- b) $n \geq 0$ *n can't be 0 - inf. recursion*
- c) $n > 0$ and $x > 0$
- d) $x \leq n$ and $n > 0$
- e) $n \leq x$ and $n > 0$

```

5. public void wow (int n)
   {
     if (n > 1)
       wow (n / 2);
     System.out.print(n + " ");
   }

```



The method call `wow(16)` will yield as output which of the following sequences of numbers?

- a) 10 8 6 4 2
- b) 16 8 4 2 1
- c) 1 2 4 8 16
- d) 32 16 8 4 2
- e) 2 4 8 16 32

out: 1 2

6. Consider the following method:

```

public int mult(int x, int y)
{
  //precondition:      x > 0
  //postcondition:    returns x * y

  if ( x == 1 )
    <statement 1>
  else
    <statement 2>
}

```



Which of the following statement pairs properly completes the method?

- | | <u><statement 1></u> | <u><statement 2></u> |
|----|----------------------------|----------------------------|
| a) | return x * y | <none> |
| b) | return y | return mult(x-1, y+1) |
| c) | return y | return mult(x, y-1) + y |
| d) | return y | return mult(x-1, y) + y |
| e) | return y | return mult(x-1, y) * y |

10. Consider the following method.

```
public void mystery (int n)
{
    if (n>2)
        mystery (n % 3);
    System.out.print((n / 3) + " ");
}
```

n 38 ↗
|
n 2

The method call `mystery(38)` will yield as output which of the following sequences of numbers?

- (A) 0 12
- (B) 12 0
- (C) 1 1 0 2
- (D) 1 1 1 1
- (E) 2 0 1 1

out: 0 12