

MACRO (M)

Indicate overall program structure

Draw nested boxes to indicate the overall program block structure.

```
int[] l = {20,24,23,35,30,35};
int a=1;
int b=l[0];
for( int i=1; i<l.length; i++){
    if( l[i]>b ){
        b=l[i];
        a=1;
    } else {
        if( l[i]==b ){
            a++;
        }
    }
}
System.out.println(a);
```

Determine redundant code

Identify and check all potential execution flows. Does each statement get executed at least once?

A: The code block below will not be executed if all elements in the array have the same value or if they are all smaller than the first element.

```
b=l[i];
a=1;
```

Summarize purpose

Summarize the goal of the program using a short sentence.

A: Prints the frequency of the highest temperature in the array.

RELATIONAL (R)

Identify scope

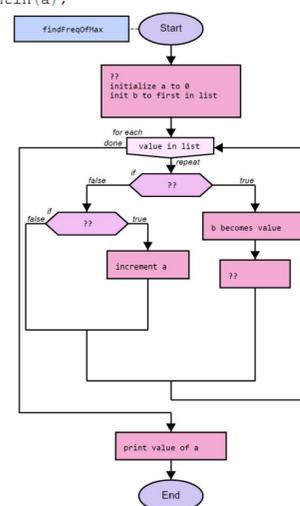
Identify the scope of variable b.

```
int[] l = {20,24,23,35,30,35};
int a=1;
int b=l[0];
for( int i=1; i<l.length; i++){
    if( l[i]>b ){
        b=l[i];
        a=1;
    } else {
        if( l[i]==b ){
            a++;
        }
    }
}
System.out.println(a);
```

Complete the code and diagram

The code and diagram below represent the same program. Complete both so they have a correct behavior.

```
int[] l = {20,24,23,35,30,35};
int a=1;
??
for( ?? ){
    if( l[i]>b ){
        ??
        a=1;
    } else {
        if( l[i]==b ){
            ??
        }
    }
}
System.out.println(a);
```



Reflect on code

For the code below, propose a more appropriate initialization than `int b = 0`.

```
int[] l = {20,24,23,35,30,35};
int a=1;
int b=0;
for( int i=0; i<l.length; i++){
    if( l[i]>b ){
        b=l[i];
        a=1;
    } else {
        if( l[i]==b ){
            a++;
        }
    }
}
System.out.println(a);
```

A: b, which is the maximum value in the temperature array could be negative.

A better alternative could be `int b = l[0]`

Identify blocks

Draw a box around the code that belongs to the `else` statement.

```
int[] l = {20,24,23,35,30,35};
int a=1;
int b=l[0];
for( int i=1; i<l.length; i++){
    if( l[i]>b ){
        b=l[i];
        a=1;
    } else {
        if( l[i]==b ){
            a++;
        }
    }
}
System.out.println(a);
```

Parson's puzzles

The following program segment should print the highest value in the array. Rearrange the blocks into the `for` loop in the correct order to complete the program.

Drag from here	Drop blocks here
4 int b=l[0];	6 int[] l = {20,24,23,35,30,35};
1 }	2 b=l[i];
5 if(l[i] > b){	7 for(int i=0; i < l.length; i++){
	8 }
	3 System.out.println(b);

Explain purpose of a block of code

Describe the purpose of this block of code.

```
int[] l = {20,24,23,35,30,35};
int b=l[0];
for(int i=0; i < l.length; i++){
    if(l[i]>b){
        b=l[i];
    }
}
System.out.println(b);
```

A: The block determines, stores in variable b, and prints the maximum temperature in a given array.

ATOMIC (A)

Identify statements

Draw a box around each assignment statement.

```
int[] l = {20,24,23,35,30,35};
int a=1;
int b=l[0];
for( int i=1; i<l.length; i++){
    if( l[i]>b ){
        b=l[i];
        a=1;
    } else {
        if( l[i]==b ){
            a++;
        }
    }
}
System.out.println(a);
```

Trace values

Determine the value of a after execution.

A: a has the value 2.

Explain the goal of an element

Given that array l represents daily temperature measurements and b is the maximum temperature measured before day i, what is the purpose of test `l[i] > b` in terms of the problem?

A: Tests if the temperature on day i is higher than b, hence hotter than any previous day.

TEXT SURFACE (T)

PROGRAM EXECUTION (P)

FUNCTION/INTENTION (F)