



# SLIIT

*Discover Your Future*

# Object-Oriented Metrics

# Weighted Composite Complexity (WCC) Measure

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- Considers complexity as a multidimensional attribute.
- Based on four key factors.
  - Size
  - Type of control structures
  - Nesting level of control structures
  - Inheritance level of statements

# Computing the WCC value

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- WCCM value of a program =  $\sum_{j=1}^n S_j * (W_t)_j$ 
  - $S_j$  = Size of  $j^{\text{th}}$  executable statement in terms of token count
  - $n$  = Total number of executable statements in a program
  - $(W_t)_j$  = Total weight of the  $j^{\text{th}}$  executable statement in the program
- $W_t = W_c + W_n + W_i$ 
  - $W_c$  = Weight due to type of control structures
  - $W_n$  = Weight due to nesting level of control structures
  - $W_i$  = Weight due to inheritance level of statements

# Question

- Identify the tokens and the size value of each statement of the following program:

Line No	Program Statements
1	public class Result{
2	public void outresult(int marks) {
3	if (marks > -1 && marks < 50 )
4	System.out.println("Fail");
5	else
6	System.out.println("Pass");
	}
7	public static void main(String args[ ]){
8	Result r = new Result( );
9	r.outresult(50);
	}
	}

# Answer

Line No	Program Statements	Tokens	Size (S)
1	public class Result{		
2	public void outresult (int marks) {	void, outresult( )	2
3	if (marks > -1 && marks < 50 )	if-else( ), marks, >, -1, &&, marks, <, 50	8
4	System.out.println("Fail");	System, ., out, ., println( ), "Fail"	6
5	else		
6	System.out.println("Pass");	System, ., out, ., println( ), "Pass"	6
	}		
7	public static void main(String args[ ]){	void, main( )	2
8	Result r = new Result( );	Result, r, =, new, Result( )	5
9	r.outresult(50);	r, ., outresult( )	3
	}		
	}		

# Weight Due to Type of Control Structures (Wc)

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Type of control structure	Weight
Sequential	0
Branch	1
Iterative	2
Switch statement with <b>n</b> cases	n

# Weight Due to Nesting Level of Control Structures (W<sub>n</sub>)

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Nesting Level of Statements	Weight
Sequential statements	0
Statements inside the outer most level/first level of control structures	1
Statements inside the second level control structures	2
Statements inside the third level control structures	3
Statements inside the n <sup>th</sup> level control structures	n



# Weight Due to Inheritance Level of Statements ( $W_i$ )

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Inheritance Level of Statements	Weight
Statements inside the base class/root class	0
Statements inside the first derived class	1
Statements inside the second derived class	2
Statements inside the $n^{\text{th}}$ derived class	$n$



# Computing the WCC Value – Question

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- Compute the WCC value of the following program:

Line No	Program Statements
1	public class Result{
2	public void outresult (int marks) {
3	if (marks > -1 && marks < 50 )
4	System.out.println("Fail");
5	else
6	System.out.println("Pass");
	}
7	public static void main(String args[ ]){
8	Result r = new Result( );
9	r.outresult(50);
	}
	}

# Computing the WCC Value – Answer

Line No	Program Statements	Tokens	S	Wc	Wn	Wi	Wt	WC
1	public class Result{							
2	public void outresult (int marks) {	void, outresult( )	2	0	0	1	1	2
3	if (marks > -1 && marks < 50 )	if-else( ), marks, >, -1, &&, marks, <, 50	8	1	1	1	3	24
4	System.out.println("Fail");	System, :, out, :, println( ), "Fail"	6	0	1	1	2	12
5	else							
6	System.out.println("Pass");	System, :, out, :, println( ), "Pass"	6	0	1	1	2	12
	}							
7	public static void main(String args[ ]){	void, main( )	2	0	0	1	1	2
8	Result r = new Result( );	Result, r, =, new, Result( )	5	0	0	1	1	5
9	r. outresult(50);	r, :, outresult( )	3	0	0	1	1	3
	}							
	}							
		<b>WCC Value</b>						<b>60</b>