Dear Student,

We would like to invite you to participate in this research study. The main objective of this survey is to compare and evaluate two metric formalism languages: software metrics definition language (SPMDL) and Formal Specification of Software Design Metrics (FSSDM). Please fill the below questionnaire for both languages to the best of your knowledge.

Name (optional): _____

Experience in Software Metrics: _____ Yes _____ No

1. Please fill the below table

Defining Metrics	**SPMDL**	**FSSDM**
The time taken to perform the tasks		
• Task 1		
• Task 2		

Task 1:

Update DIT metric to calculate the number of children i.e. the length from the parent to the root (only the maximum path should be considered)

FSSDM

$$DIT: ObjectDef \times RedefinableElement \rightarrow \mathbb{N}$$

$$\forall o: ObjectDef; r: RedefinableElement \mid isRoot(o, r) = TRUE \bullet DIT(o, r) = 0$$

$$\forall o: ObjectDef; r: RedefinableElement; R: \mathbb{P}\, RedefinableElement; n: \mathbb{N}; S: \mathbb{P}\, \mathbb{N}$$
$$\mid PARN(o, r) \geqslant 1$$
$$\wedge R = parents(o, r)$$
$$\wedge S = \{ depth: \mathbb{N} \mid \forall r': R \bullet depth = DIT(o, r') \}$$
$$\wedge n = max\, S \bullet DIT(o, r) = n$$

SPMDL

```
<metric>
    <acronym>DIT</acronym>
    <title>Depth of Inheritance Tree</title>
    <authority>
        <authors name="C&K" date="1994" />
    </authority>
    <computation>
        <dmmQuery>
            <unit>Class</unit>
            <visitor scope="class" variable=”c”>
                <variable name="DIT" type="list" scope="class" />
                <invalidationCriteria affectedElement="Class"variableName=”parent”
                 condition="parent eq null" scope="Package" />
                <variable name="isVisited" type="long" scope="class" />
                <math:expression>
                    <linkLong name="dit"/>
                        <add datatype="long">
                              <long value="1"/>
                        </add>
                    </linkLong>
                </math:expression>
            </visitor>
        </dmmQuery>
    </computation>
</metric>
```

Task 2:

Write a metric to count number of lines of code (LOC)

FSSDM

SPMDL

SPMDL and FSSDM Examples

SPMDL

FSSDM

Weighted Methods Complexity (WMC): the sum of the complexity of all methods for a class. If all method complexities are considered to be unique, WMC is equal to the number of methods.

```
<metric>
    <acronym>WMC</acronym>
    <title>Weighted Method per Class</title>
    <authority>
        <authors name="C&K" date="1994" />
    </authority>
    <computation>
    <dmmQuery>
        <visitor scope="class">
            <variable name="numMethods" type="long" scope="class" />
        </visitor>
        <visitor scope="method">
            <math:expression>
                <linkLong name="numMethods"/>
                    <add datatype="long">
                        <long value="1"/>
                    </add>
                </linkLong>
            </math:expression>
        </visitor>
    </dmmQuery>
    </computation>
</metric>
```

$$WMC: ObjectDef \times Classifier \rightarrow \mathbb{N}$$

$$\forall o: ObjectDef; c: Classifier; S: \mathbb{P}\, Operation \mid S = allOperations(o, c) \bullet WMC(o, c) = \#S$$

Depth of Inheritance Tree (DIT): measures the length of the inheritance chain from the current class to the root.

```
<metric>
    <acronym>DIT</acronym>
    <title>Depth of Inheritance Tree</title>
    <authority>
        <authors name="C&K" date="1994" />
    </authority>
    <computation>
        <dmmQuery>
            <unit>Class</unit>
            <visitor scope="class" variable=”c”>
                <variable name="DIT" type="list" scope="class" />
                <invalidationCriteria affectedElement="Class"variableName=”parent”
                 condition="parent eq null" scope="Package" />
                <variable name="isVisited" type="long" scope="class" />
                <math:expression>
                    <linkLong name="dit"/>
                        <add datatype="long">
                            <long value="1"/>
                        </add>
                    </linkLong>
                </math:expression>
            </visitor>
        </dmmQuery>
    </computation>
</metric>
```

$$DIT: ObjectDef \times RedefinableElement \rightarrow \mathbb{N}$$

$$\forall o: ObjectDef; r: RedefinableElement \mid isRoot(o, r) = TRUE \bullet DIT(o, r) = 0$$

$$\forall o: ObjectDef; r: RedefinableElement; R: \mathbb{P}\, RedefinableElement; n: \mathbb{N}; S: \mathbb{P}\, \mathbb{N} \mid PARN(o, r) \geqslant 1 \wedge R = parents(o, r) \wedge S = \{ depth: \mathbb{N} \mid \forall r': R \bullet depth = DIT(o, r') \} \wedge n = max\, S \bullet DIT(o, r) = n$$