SOFTWARE PROJECT MANAGEMENT LAB - G2
EXPERIMENT 3

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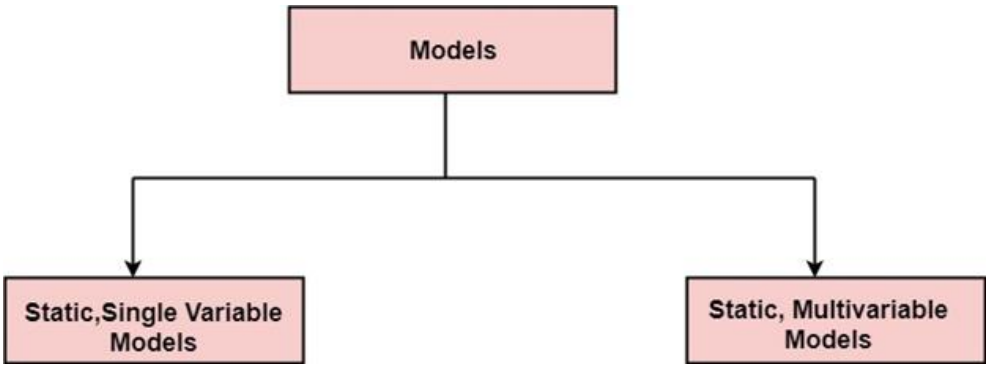
- 2K18/SE/041

AIM:- Implement the Walston-Felix model and SEL model to estimate LOC, development duration and productivity when expected effort is provided. Compare the performance of both the models.

THEORY:-

A model may be static or dynamic. In a static model, a single variable is taken as a key element for calculating cost and time. In a dynamic model, all variable are interdependent, and there is no basic variable.



Static, Single Variable Models: When a model makes use of single variables to calculate desired values such as cost, time, efforts, etc. is said to be a single variable model. The most common equation is:

$$C = aL^b$$

Where C = Costs,
L= size,
a and b are constants

The Software Engineering Laboratory established a model called SEL model, for estimating its software production. This model is an example of the static, single variable model.

$E = 1.4L^{0.93}$
$DOC = 30.4L^{0.90}$
$D = 4.6L^{0.26}$

Where E = Efforts (Person per Month),
DOC = Documentation (Number of Pages),
D = Duration (D, in months),
L = Number of Lines per code

Static, Multivariable Models: These models are based on several variables describing various aspects of the software development environment. In some model, several variables are needed to describe the software development process, and selected equation combined these variables to give the estimate of time & cost. These models are called multivariable models.

WALSTON and FELIX develop the models at IBM provide the following equation gives a relationship between lines of source code and effort:

$$E = 5.2L^{0.91}$$

In the same manner duration of development is given by

$$D=4.1L^{0.36}$$

The productivity index uses 29 variables which are found to be highly correlated productivity as follows:

$$I = \sum_{i=1}^{29} W_i X_i$$

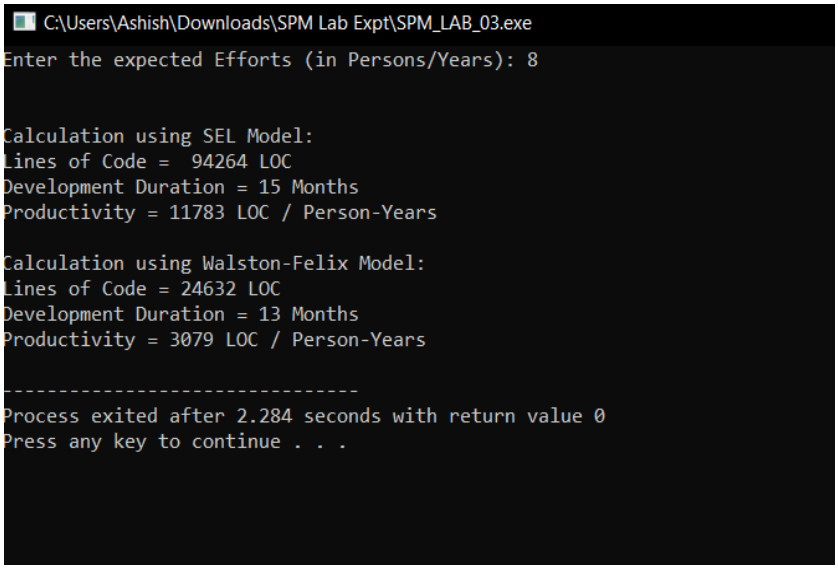
Where W_i is the weight factor for the i^{th} variable and $X_i=\{-1,0,+1\}$ the estimator gives X_i one of the values -1, 0 or +1 depending on the variable decreases, has no effect or increases the productivity.

CODE:-

```
#include<bits/stdc++.h>
#include<iostream>
using namespace std;
int main() {

   float effort ;
   cout<<"Enter the expected Efforts (in Persons/Years): ";
   cin>>effort;
   effort=effort*12;
   cout<<endl;

   cout<<"\nCalculation using SEL Model:"<<endl;
   float LOC = pow((effort/1.4),(1/0.93));
   float duration = 4.6* pow(LOC,0.26);
```

```
    cout<<"Lines of Code =  " << round(LOC*1000) <<" LOC"<<endl;
    cout<<"Development Duration = "<< round(duration) << " Months"<<endl;
    cout<<"Productivity = " << round((LOC*1000)/(effort/12))<<" LOC / Person-Years"<<endl;
    cout<<endl;

    cout<<"Calculation using Walston-Felix Model:"<<endl;
    LOC = pow((effort/5.2),(1/0.91));
    duration = 4.1* pow(LOC,0.36);
    cout<<"Lines of Code = "<< round(LOC*1000) <<" LOC"<<endl;
    cout<<"Development Duration = "<< round(duration) << " Months"<< endl;
    cout<<"Productivity = " << round((LOC*1000)/(effort/12)) <<" LOC / Person-Years"<<endl;
}
```

OUTPUT:-



Finding & Learning: - We have successfully implemented Walston-Felix model and SEL model and calculated LOC, development duration and productivity when expected effort is provided.

We noticed that by using Walston-Felix model, the size of the project i.e. LOC is less, development duration is less as compared to SEL model. So, Walston-Felix model is preferred over SEL model for Software Cost Estimation.