# Evaluation Plan

We test the prototypes designed with approaches mentioned in the earlier chapter as per the experimental design guidelines.

## Experiment Design

### Number of Test Users

The target users for evaluation are experienced software developers who have a good knowledge of software development and, ideally, used one of the static analysis tool in their development process or at least aware of it. So, if not the professional software developers, at least the students pursuing a Master’s degree in Computer Science. This ensures that the evaluation process is valid and authentic. There will be at least five users selected for testing the prototypes. One might be surprised about why only five users required, the reason behind that is well explained by Human-Computer Interaction researcher Dr Jakob Nielsen with a simple formula.

Where **N** is the total number of usability problems exist in the design, **L** is the proportion of usability problems discovered while testing a single user which is typically 31% as found in his research. The plot shown in further illustrates that after the number of users is five, then the usability problems discovered does not increase much further as there would be a high overlap with already found usability problems by previous users. Thereby, five users are selected for each iteration of the User Experience Design cycle to test the prototype designs.

A plot illustrating the usability problems found with the users.

A plot illustrating the usability problems found with the users.

### Order of Evaluation

As the order of prototypes with different solution ideas presented in evaluation could influence the user, as they tend to learn. Therefore, the order is changed for different segments of users, which could lead to a qualitative result. For instance, let us say there are two prototypes named A and B. Half of users i.e., three in our case will have prototype A tested first and another half i.e., two users will test B first.

## Usability Inspection Methods

There are many usability inspection methods like Heuristic evaluation, Heuristic estimation, Cognitive walkthrough, Pluralistic walkthrough, Feature inspection, Consistency inspection, Standards inspection and Formal usability inspection. Out of which, we test the usability aspect of the prototypes with ‘Cognitive walkthrough’.

### Cognitive Walkthrough

In a cognitive walkthrough, we ask users to perform tasks which has a pre-defined steps. An example for a task could be finding a common bug reported by available tools. For each step, there are questions examined to determine usability. Blackmon, Polson, et al. in their paper mentions four questions which are significant to analyse while performing Cognitive Walkthrough for the Web. They are;

1. Will the user try and achieve the right outcome?
2. Will the user notice that the correct action is available to them?
3. Will the user associate the correct action with the outcome they expect to achieve?
4. If the correct action is performed; will the user see that progress is being made towards their intended outcome?

These questions are also quite applicable in our context. Thereby, these questions are assessed for each step, which is predetermined with designed elements on the user interface in order to solve the research question been tackled. So, the steps vary for each design. This approach gives qualitative feedback from a user as they are a mostly open-ended scenario to discuss especially, for questions which are answered as ’No’ would lead to having their suggestions/feedback.  
  
Overall, cognitive walkthrough helps to identify the usability problems in detail as possible, which is a qualitative analysis. Further, when over two best solution ideas are needed to be evaluated against each other, then a polling method with a simple choice of solution idea and an usability rating are considered. It is simply to estimate which is more accepted by users with a parameter of the majority where more number of users/evaluators could determine the stronger validity of voting which is a quantitative analysis.