Chapter 4 Research Methodology

Research Methodology is a way to find out the answers to a given problem on the specific matter or problem that's also referred as research problem. In Methodology, researcher uses different criteria for solving/searching the given research problem. Different sources use different style of techniques for solving the condition.

In Research Methodology, researcher always tries to go looking for solutions to the given question systematically within his own way to see each of the answers till conclusion. If research does not work systematically on problem, there would be less possibility to learn one more result. For finding or exploring research questions, a researcher faces large amount of problems that might be effectively resolved with using correct research methodology.

Research methodology stated how the researcher will progress towards the research and a good methodology helps the researcher keep the research well directed so that it could achieve the desired targets and answers to the given questions. Research type was experimental as are most of the other researches in computer science.

In line with the research type, this research design also has a conceived plan and structure of investigation to obtain answers to the research questions. This research is organized in the following manner. Initial step is to analyze the past, present of mobile phone applications and operating systems. Research Methodology included these steps so as to guide and control the research:

The researcher first had to know very well what would be the operating systems getting used most during the time of study so your threats identified assists in larger mobile users group. The researcher identified that at the time when this research started, Nokia’s Symbian was clearly number one mobile OS with Apple’s iOS taking up its share specifically in higher end mobile phones, and Google’s Android was just a new entrant in the field of mobile OS. But as the research started building and advancing a strong need was felt to leave Symbian out of study as it has literally been wiped out and probably even its traces will be gone by the time this thesis is complete. The mobile OS world has been dominated by Android with a very distant number two in iOS. Blackberry and Symbian are almost past. So this research
discusses application security issues related to iOS and Android, but is based on programming and execution of applications on Android only. Also the researcher had to find facilities where he could get a good experience of the hardware and software required to code make an attempt to test algorithms and ideas from the researcher. Each one of these requirements imposed the first evident limitation for the research of finding sufficient number of professionals with this field in the state like Rajasthan, plus required hardware and software too was a constraint. To start with this was a major constraint but towards end of the research it was hardly a constraint because Android had grown in such a big way and its development activity was so high due to it being open source and Linux based that the researcher got sufficient support for his discussions and experiments.

As a way to overcome these limitations the researcher constantly took guidance from the research supervisor to get leads where the researcher could discover the desired resources. In consultation with the research supervisor the researcher endeavored to identify a combination of suitable facilities and experts for the research.

Research started with basic observations and theoretical insights derived from literature. Research methods applied were mainly literature survey, testing and experimentation.

The present research was exploratory for identifying the threat models for the mobile applications and once the loop holes had been identified the methodology adapted was experimental to try and find out ways of overcoming those loopholes. The methodology of research was according to the specific application and the operating system it is being run on. But as for any type of research topic, it is very important that some literature review be done to learn the previous and ongoing research on the topic chosen. Then only can the researcher avoid duplicating research done previously by someone else. At the same time, it also exposes the gaps and deficiencies in existing knowledge on the subject which this study can contribute to fulfill. In the case of a computer science thesis, this is very important because there are numerous research projects going on at various research institutes. Next, the researcher gathered data required for the purpose of the duty at hand. In this research data collection source for primary data were experiments, while secondary data were collected from different sources like books, journals, etc. Finally the information was analyzed, and ultimately the end result of all of the data gathering exercise and research is being presented. With this step, conclusions or suggestions were derived by the researcher
on the basis of the analysis done. The actual final outcome is for the research and suggestions are for the developers for the improvement with the use of accomplishing this.

Objectives of this research can be specified as:

- Identifying possible security threats in the mobile applications
- Study of relevant research papers and books about the security of mobile phones and their applications
- Determining solutions against known and future security vulnerabilities