1. Project Name

Flowchart planning and simulation tool

2. Project Vision and Objectives

This project sets out to create an application for the planning and simulation of flowcharts, which can be used in an education setting for an introductory program logic course. The objective is to develop an application that can feasibly be used in such a practical setting. The application must be visual in nature, due to the visual nature of flowcharts. The application must facilitate exploration and experimentation, while providing clear feedback to the user as to how the program executes.

3. Project Owners

Willem van Heerden (email: wvheerden@cs.up.ac.za).

4. Project Scope

The project consists of the following two components:

- A planning canvas, in which a flowchart can be built using an intuitive drag-and-drop editor. Flowchart components will be selected and dropped into the canvas, and connected into complete flowcharts. The system will also have to do error checking on the constructed flowcharts, so that (for example) multiple entry points into a program or certain flowchart components are not allowed.
- An execution system, in which a flowchart can be run from start to finish. The system should allow for one-click execution of the entire program, as well as step-by-step execution. At all stages during execution, the currently executing component should be highlighted, as well as the connection path being followed. The program's execution should be very visually apparent and appealing. The output of the flowchart's execution should also be apparent.

The following components are specifically excluded from the scope of the project:

- No executable program code generation will be required for this project.
- No complex design elements (such as user-defined component assemblies) are required. Only the basic components of standard flowcharts are necessary.

5. Architectural Requirements

The project has the following quality requirements:

- The final application must be very reliable, allowing the execution of any valid program expressed as a flowchart, without errors. Thorough testing of flowcharts of varying size and complexity must be undertaken.
- The project must be very well designed and documented, so that continued development is possible.
- Performance is not a major concern. However, the system must provide feedback to the user during flowchart building and execution in a reasonable amount of time.
- The system must allow flowchart construction of at least the complexity encountered during a first year introductory programming course, with no errors or memory leaks.
Security is not a concern. The system is not required to interface with any existing systems. It is intended for execution on a desktop computer running the Linux operating system.

6. Skills Requirements

A good knowledge of the following skills are all essential requirements that the project team must fulfil:

- Object oriented programming and design patterns.
- Data structures.
- Good GUI design and HCI knowledge.

7. Project Deliverables

The following deliverables are required:

- A fully functional application.
- The source and testing program code.
- Documentation generated during development (including requirements, architecture, design, and test plan documents).
- A user manual should be provided in an electronic format, that can be accessed by the user. The manual should be well organised, thorough, and should include examples of the various functions that are available.

8. Intellectual Ownership

The project will be utilised as a tool used by students during the practical component of the COS151 (Introduction to computer science) module in the Computer Science Department of the University of Pretoria. As such, copyright will be held by the University of Pretoria. The possibility of making the project available as open source, as well as commercial possibilities may be investigated at a later date.

9. Client Commitments

The client undertakes to provide the following:

- A working open source tool that is currently used during the practical component of COS151, but which does not fully fulfil the requirements of the course.
- Between one and two hours of consultation time per week.
- Regular meetings, should they be deemed necessary.

10. Supporting Documents

None