# SCAPES

Functional Model Document

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1. **Functional Requirements**

| | |
|---|---|
| F-01 | Programmer/SystemAdmin users must be able to load a saved SCAPL program from an existing file. |
| F-02 | Programmer/SystemAdmin users must be able to save a SCAPL program to a file. |
| F-03 | Programmer/SystemAdmin users must be able to create a SCAPL program. |
| F-03-01 | Programmer/SystemAdmin users must be able to write a program in the SCAPL language using the SCAPL instruction set. |
| F-03-02 | Programmer/SystemAdmin users must be able to edit a program in the SCAPL language using the SCAPL instruction set. |
| F-03-03 | Programmer/SystemAdmin users must be able to compile a program, written the SCAPL language, which produces a source file. |
| F-04 | Programmer/SystemAdmin users must be able to run/execute the source file produced after compiling a SCAPL program. |
| F-05 | SystemAdmin user must be able to change the system preferences. |
| F-05-01 | SystemAdmin user must be able to change the preferred programming language. |
| F-05-02 | SystemAdmin user must be able to change the storage directories. |

2. **Non-Functional Requirements**

| | |
|---|---|
| **Usability** | |
| NFR-01 | All users should see color-coding schemes for SCAPL text, when writing a program in SCAPES. |
| NFR-02 | All users should have access to supplementary documentation/FAQS, from the SCAPES website, as resource. |
| NFR-03 | All error messages shown by SCAPES should be clear and show exactly where the error took place. |
| **Reliability** | |
| NFR-04 | SCAPES should back up every minute or after the user hits `Enter` on the keyboard. |
| NFR-05 | SCAPES should have an overall crash rate less than or equal to 98%. |
| **Performance** | |
| NFR-06 | SCAPES should never take long time to perform important/critical actions. |
| NFR-06-01 | SCAPES should never take longer than 5 seconds to save a program. |
| NFR-06-02 | SCAPES should never take longer than 5 seconds to load a program. |
| NFR-06-03 | SCAPES should never take longer than 5 seconds to execute a program. |
| NFR-07 | 99% of the time, SCAPES should never be the root cause of any computer lag. |
| **Supportability** | |
| NFR-8 | SCAPES should be supported on the most current Windows and MacOS operating system versions. |
| NFR-9 | The SCAPES system should require less than 50mB of disk space to be installed. |
| **Implementation** | |
| NFR-10 | SCAPES must be written in C++. |
| NFR-11 | SCAPES must be implemented on Ubuntu Linux. |
| **Interface** | |
| NFR-12 | The SCAPES compiler feature will interact with the operating system task manager/activity monitor in the event something unexpectedly wrong where to happen with SCAPES. |
| NFR-13 | In the future, the SCAPES system intends of integrating version control (Git) functionality into the development environment to track changes on origin/upstream. |
| **Operations** | |
| NFR-14 | SCAPES should have less than 7 installation steps. |
| NFR-15 | SCAPES should have an auto-update option for users. |
| NFR-16 | SCAPES users should be prompted to update their software when security patches or hot fixes are released for the software. |
| **Packaging** | |
| NFR-17 | SCAPES should be a downloadable executable program for all users, from the SCAPES website. |
| NFR-18 | The SCAPES website will offer all past and future beta versions for users. |
| **Legal** | |
| NFR-19 | SCAPES shall follow the ACM code of ethics during the entirety of its formation and existence. |
| NFR-20 | SCAPES will be protected under the Canadian Copyright Law. |

## 3. **Use Cases**

### 3.1 Use case diagram for the SCAPES system

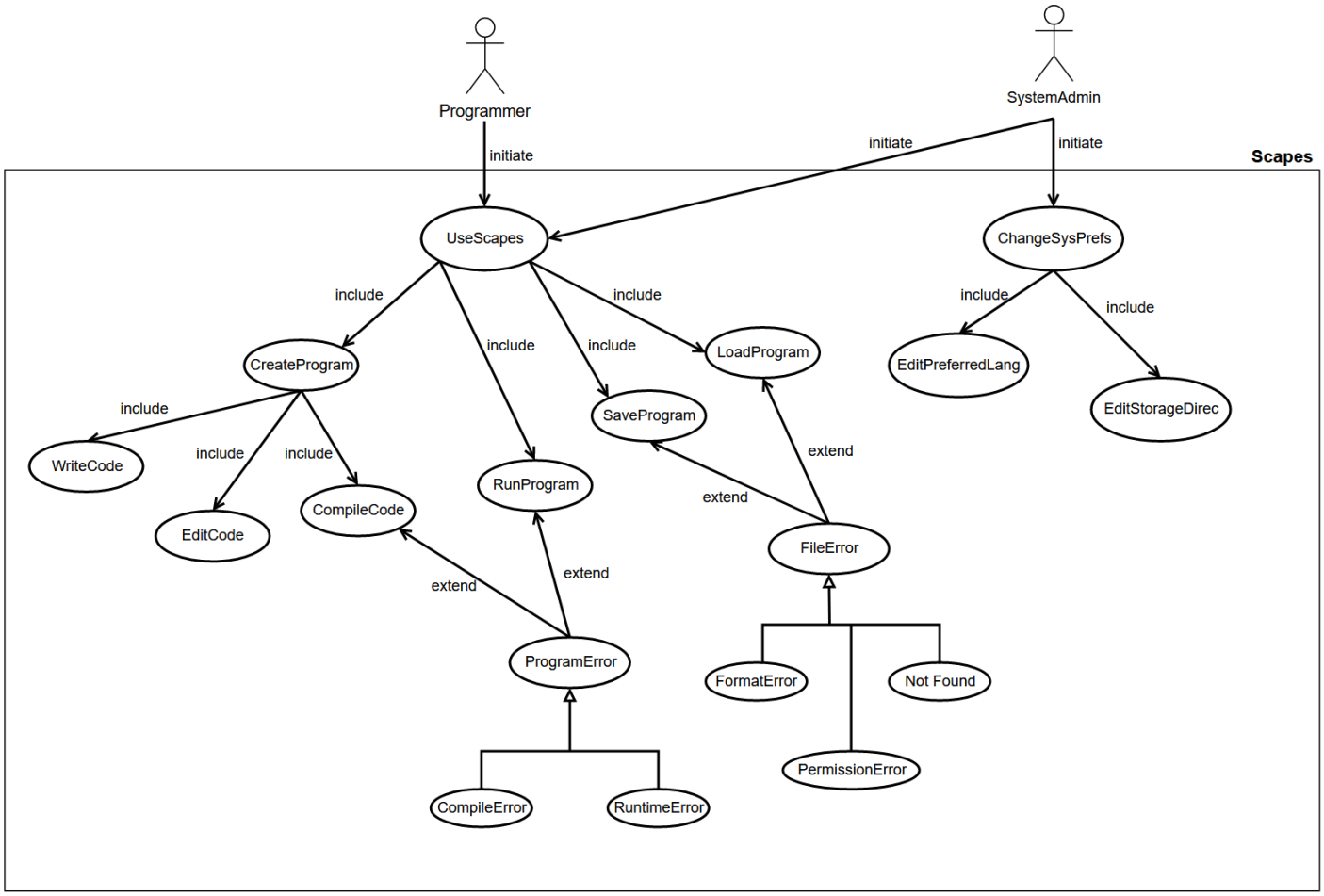


*Figure 1 – UML Use Case Diagram*

3.2 Use case table descriptionsS

| Use Case Id | UC-01 |
|---|---|
| Name | **UseScapes** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | 1. The Programmer or SystemAdmin begins creating a program, which is handled by the included use case **CreateProgram**. The user can also either save the current program they are working on with the **SaveProgram** use case or they can load a program with **LoadProgram.** |
| Entry Conditions | The user runs the SCAPES system. |
| Exit Conditions | The user writes, edits or compiles the program. |
| Quality Requirements | |
| Traceability | F-01, F-02, F-03, F-04 |

| Use Case Id | UC-02 |
|---|---|
| Name | **LoadProgram** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | The Programmer or SystemAdmin must be using Scapes. |
| Exit Conditions | The program is loaded from the specified directory/name. |
| Quality Requirements | - Programs should only be loaded from directories that exist, or if the file exists in that directory.<br>- Programs should only be loaded from directories where the user has read permissions. |
| Traceability | F-01 |

| Use Case Id | UC-03 |
|---|---|
| Name | **SaveProgram** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | The Programmer or SystemAdmin must be using Scapes. |
| Exit Conditions | The program is saved and stored to the specified directory/name. |
| Quality Requirements | - Programs should only be saved in directories where the Programmer or SystemAdmin has write permissions. |
| Traceability | F-02 |

| Use Case Id | UC-04 |
|---|---|
| Name | **CreateProgram** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | The Programmer or SystemAdmin must be using Scapes. |
| Exit Conditions | The user exits the SCAPES system. |
| Quality Requirements | - The SCAPES should back up every minute or after the user hits `Enter` on the keyboard. |
| Traceability | F-03, NFR-04 |

| Use Case Id | UC-05 |
|---|---|
| Name | **WriteCode** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | - The Programmer or SystemAdmin must be using Scapes.<br>- The user must write SCAPL code using their keyboard. |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | F-03-01 |

| Use Case Id | UC-06 |
|---|---|
| Name | **EditCode** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | - The Programmer or SystemAdmin must be using Scapes.<br>- The Programmer or SystemAdmin must load a previous program. |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | F03-02 |

| Use Case Id | UC-07 |
|---|---|
| Name | **CompileCode** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | - The Programmer or SystemAdmin must be using Scapes.<br>- There must be SCAPL code in the program to be compiled. |
| Exit Conditions | The code completes the compilation process and is ready to be executed. |
| Quality Requirements | |
| Traceability | F03-03 |

| Use Case Id | UC-08 |
|---|---|
| Name | **RunProgram** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | The Programmer or SystemAdmin must be using Scapes.<br>The SCAPL program must have been compiled. |
| Exit Conditions | The SCAPL program executes. |
| Quality Requirements | |
| Traceability | F-04 |

| Use Case Id | UC-09 |
|---|---|
| Name | **FileError** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | - A file processing operation has failed.<br>- Extends use cases **LoadProgram** and **SaveProgram**. |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | |

| Use Case Id | UC-10 |
|---|---|
| Name | **ProgramError** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | - A compile time error or runtime operation has failed.<br>- Extends use cases **CompileCode** and **RunProgram**. |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | |

| Use Case Id | UC-11 |
|---|---|
| Name | **CompileError** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | |

| Use Case Id | UC-12 |
|---|---|
| Name | **RuntimeError** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | |

| Use Case Id | UC-13 |
|---|---|
| Name | **FormatError** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | |

| Use Case Id | UC-14 |
|---|---|
| Name | **NotFound** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | |

| Use Case Id | UC-15 |
|---|---|
| Name | **PermissionError** |
| Participating Actors | Initiated by Programmer or SystemAdmin |
| Flow of Events | |
| Entry Conditions | |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | |

| Use Case Id | UC-16 |
|---|---|
| Name | **ChangeSysPrefs** |
| Participating Actors | Initiated by SystemAdmin |
| Flow of Events | |
| Entry Conditions | |
| Exit Conditions | |
| Quality Requirements | |
| Traceability | F-05 |

| Use Case Id | UC-17 |
|---|---|
| Name | **EditPreferredLang** |
| Participating Actors | Initiated by SystemAdmin |
| Flow of Events | |
| Entry Conditions | The SysAdmin must be in the system preferences. |
| Exit Conditions | The preferred programming language was set to the desired language. |
| Quality Requirements | |
| Traceability | F-05-01 |

| Use Case Id | UC-18 |
|---|---|
| Name | **EditStorageDirec** |
| Participating Actors | Initiated by SystemAdmin |
| Flow of Events | |
| Entry Conditions | The SysAdmin must be in the system preferences. |
| Exit Conditions | The storage directory was set to the desired location. |
| Quality Requirements | |
| Traceability | F-05-02 |