

Singularity Software
Milestone 2

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By signing below, I approve the contents of the following document.

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1 Executive Summary

This document is the second in a series of milestone documents that will accompany the planning of the Siftables Emulator. The Emulator project is a first of its kind application that will allow developers of Sifteo applications to test the features of the cubes in a virtual programming environment. Currently, the only way to test apps developed for the Sifteo Cubes platform is with the physical cubes; this project will eliminate that need and serve as a demo for the possibilities of the Sifteo platform.

This milestone elaborates the functional features of the the Siftables Emulator project. It first gives a brief background of the project before moving on to elaborate features with use cases and declarative statements, where appropriate. It also maps all covered use cases to their relevant features. Finally, it presents mockups of the Emulator's design for consideration and to solicit client feedback. Future milestones will present plans for change control, coding standardization, and testing. Finally, design and usability reports will make up the core of milestones near the end of the quarter as the software stabilizes.

2 Introduction

Developers of applications for the Sifteo Cubes currently must test programs they create for the platform on the Cubes themselves. With a full release of the Cubes and corresponding Application Programming Interface (API) still pending, developers unable to join the Sifteo Early Access program are left without a software-based interface within which to productively develop Sifteo programs. As such, Singularity Software will provide, in the form of the Siftables Emulator, a software-based emulator for the Sifteo Cubes that will allow any developer to try programming in the unique environment provided by the Cubes.

Milestone 2 lays the foundation of the Siftables Emulator specification based on the high-level design created in Milestone 1. It will be supplemented by the specification and prototypes in Milestone 3. Milestone 4 will rely on these early milestones as they define a change control plan and test cases, and Milestone 5 will elaborate the usability guidelines and interface design that implement the features and use cases described herein.

3 Project Background

The Siftables Emulator is being developed by Singularity Software as part of the Junior Project sequence of classes at Rose-Hulman Institute of Technology. When projects were solicited for the sequence, clients Tim Ekl and Eric Stokes (both Rose-Hulman alumni) submitted a request for an emulator for Sifteo Cubes, a new platform intended for "intelligent play." After Singularity was chosen for the project, we met with Mr. Ekl to determine the three primary features of the Emulator: a Workspace where 1-6 cubes could mimic the manipulations possible with physical Cubes, an API to program those virtual cubes, and a set of example games designed to show off the first two features. Singularity's Emulator will be the first program of its kind on the market for Sifteo Cubes.

4 Use Cases

4.1 Load program

Name: Load program

Description: User selects program file and loads it into the emulator.

Actors: User

Basic flow:

1. User presses "Load a program" button.
2. User selects *.siftem file in file dialog.
3. User presses "Open" button.
4. Emulator loads program on cubes in emulator.

Alternate flows:

When the user opens an incompatible file (i.e. any file without the .siftem extension), or

When the user opens a corrupt or otherwise unloadable file, or

When the user presses "Cancel" button:

1. An error dialog summarizing the issue is presented to the user.
2. The use case terminates and no program is loaded.

Pre-conditions:

1. Emulator is running.

Post-conditions:

1. Program is loaded or user cancelled loading.

Special requirements

1. Emulator should indicate when program is finished loading.

4.2 Reload program

Name: Reload program

Description: User reloads the current program file in the emulator.

Actors: User

Basic flow:

1. User presses "Reload this program" button.
2. User presses "Yes" on caution dialog.
3. Emulator loads program on cubes in emulator.

Alternate flows:

When User presses "no" on caution dialog:

1. The use case terminates and the program is not reloaded.

Pre-conditions:

1. A program is loaded in the emulator.

Post-conditions:

1. Program is loaded.

Special requirements:

1. Emulator should indicate when program is finished loading.

4.3 Zoom screen

Name: Zoom screen

Description: User selects program file and loads it into the emulator.

Actors: User

Basic flow:

1. User adjusts zoom slider.
2. Emulator magnifies cubes in emulator according to zoom level.

Alternate flows:

None

Pre-conditions:

1. Emulator is running.

Post-conditions:

1. Program running at beginning of use case, if any, is still running.

4.4 Add/remove cubes

Name: Add/remove cubes

Description: User adjusts the number of cubes present in the emulator.

Actors: User

Basic flow:

1. User adjusts "Number of cubes" slider or spinbox.
2. Emulator adds/removes cubes in emulator.

Alternate flows:

None

Pre-conditions:

1. Emulator is running.

Post-conditions:

1. Number of cubes has been adjusted to number specified.
2. Program running at beginning of use case, if any, is still running, but only on the cubes not newly added.

4.5 Snap cubes to grid

Name: Snap to grid

Description: User resets the cubes to their initial positions in the emulator.

Actors: User

Basic flow:

1. User presses "Snap to Grid" button.
2. Emulator moves cubes to a grid orientation based on their current positions.

Alternate flows:

None

Pre-conditions:

1. Emulator is running.

Post-conditions:

1. Cubes are arranged in a grid.

4.6 Manipulate cube

Name: Manipulate cube

Description: User manipulates a cube by clicking buttons or the cube itself.

Actors: User

Basic flow:

1. User double clicks on cube.
2. Cube responds as if a screen click occurred.

Alternate flows:

1. User clicks on buttons superimposed on cube edges.
2. Cube executes appropriate action (i.e. flips, rotates, tilts).
1. User drags cube next to another cube.
2. Cube communicates ("neighbors") with the cube(s) it is adjacent to.

Pre-conditions:

1. Emulator is running.

Post-conditions:

1. If a program is running, the emulator has updated its state based on the cube's change.

4.7 API

The emulator will include an API in order to define a set of rules and specifications for the software.

4.8 Example games

The emulator will include games as examples for the user to demonstrate how the cubes interact with each other.

5 Use Case Feature Mapping

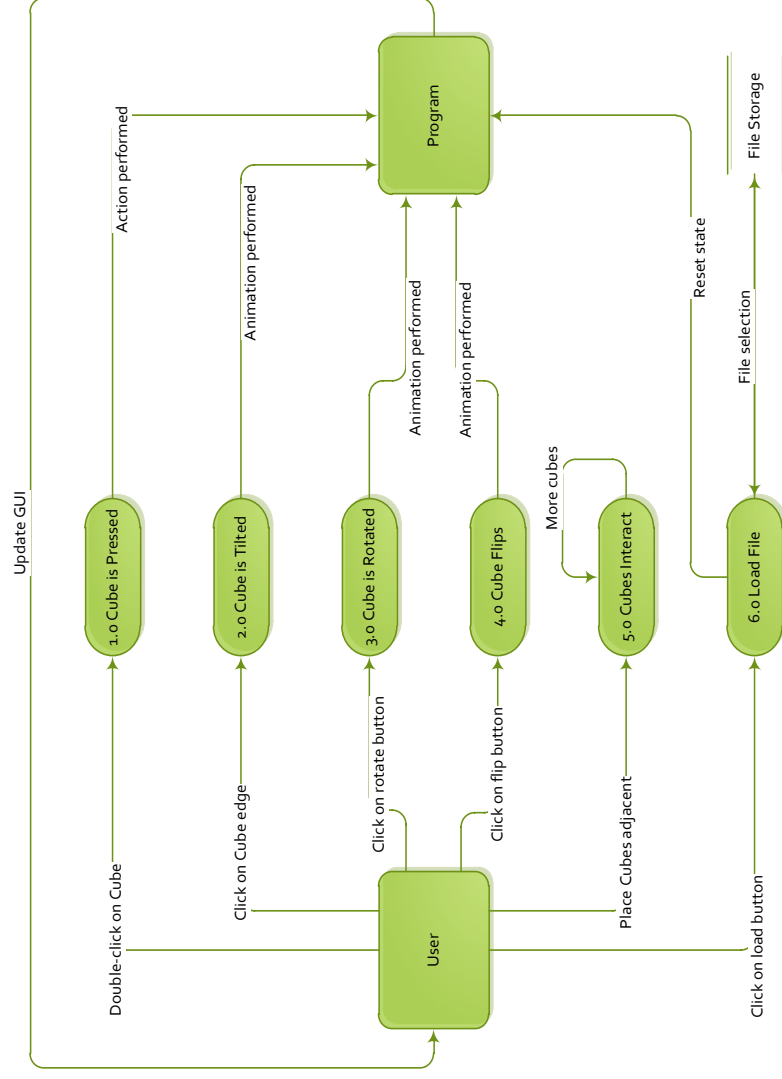
The feature listing can be found in appendix A, and the use case IDs refer to the use cases specified above.

Use case ID	Use case	Feature ID
U1	Load program	F5
U2	Reload program	F5
U3	Zoom screen	F7
U4	Add/remove cubes	F3, F4
U5	Snap cubes to grid	F6
U6	Manipulate cube	F1, F2, F3

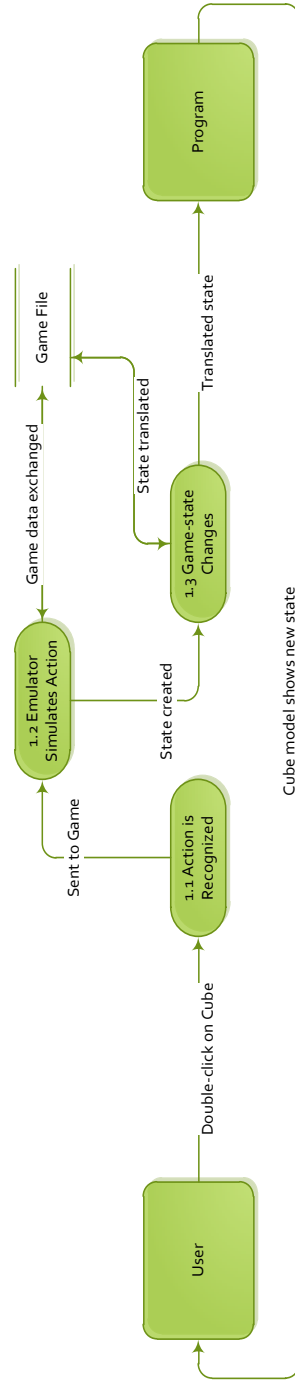
6 Data Flow Diagrams

The data flow diagrams are shown on the following pages, beginning with the level 0 diagram which is followed by the more specific diagrams.

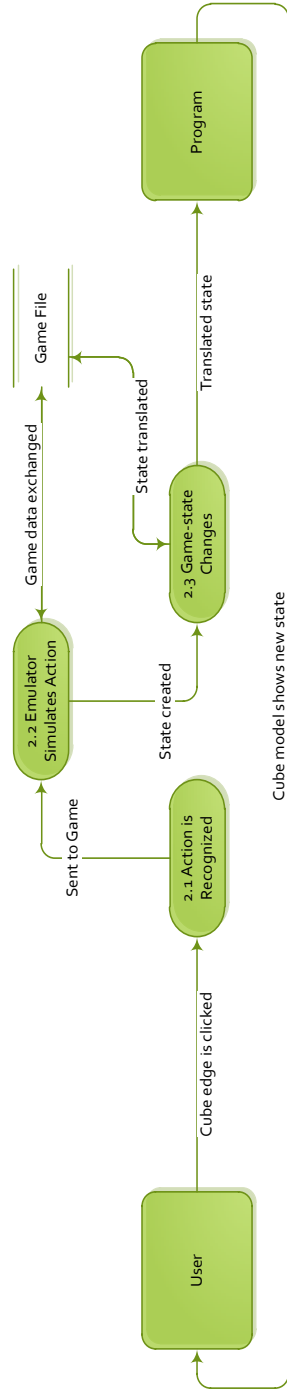
Level o Data Flow Diagram



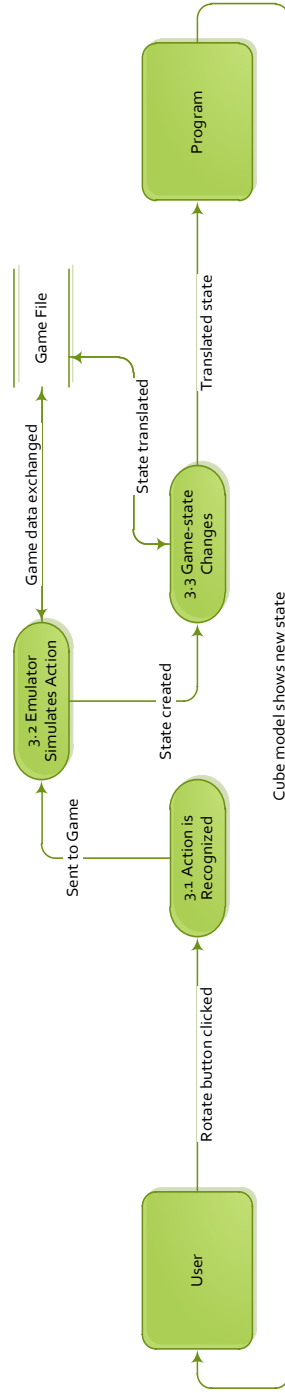
Level 1-1 Data Flow Diagram



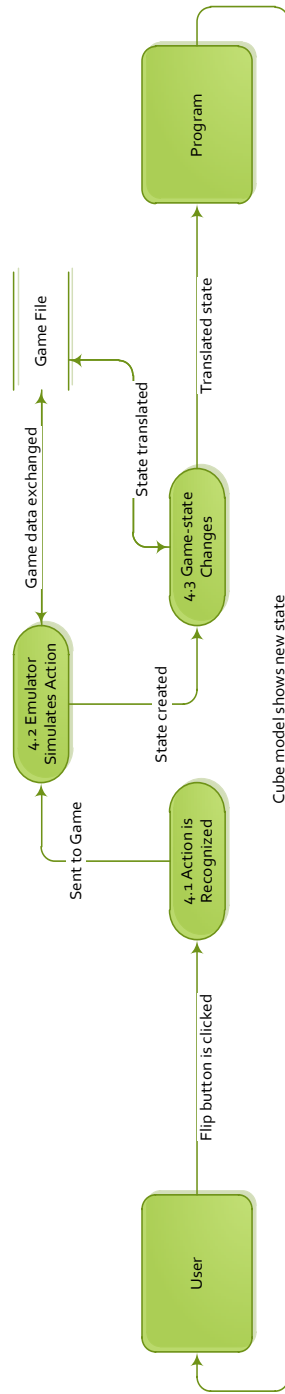
Level 1-2 Data Flow Diagram



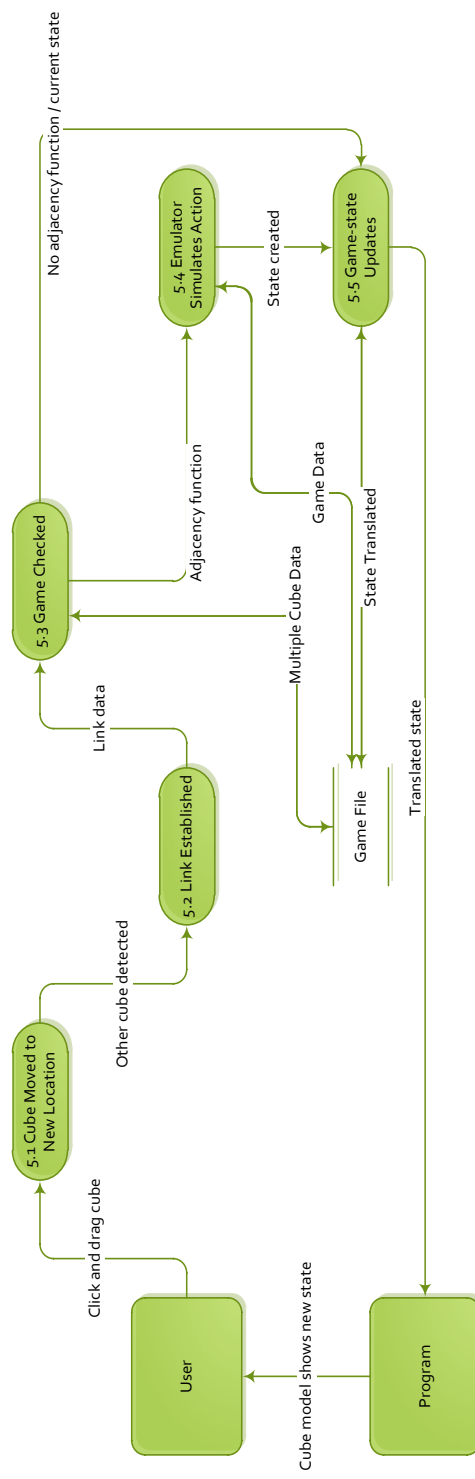
Level 1-3 Data Flow Diagram



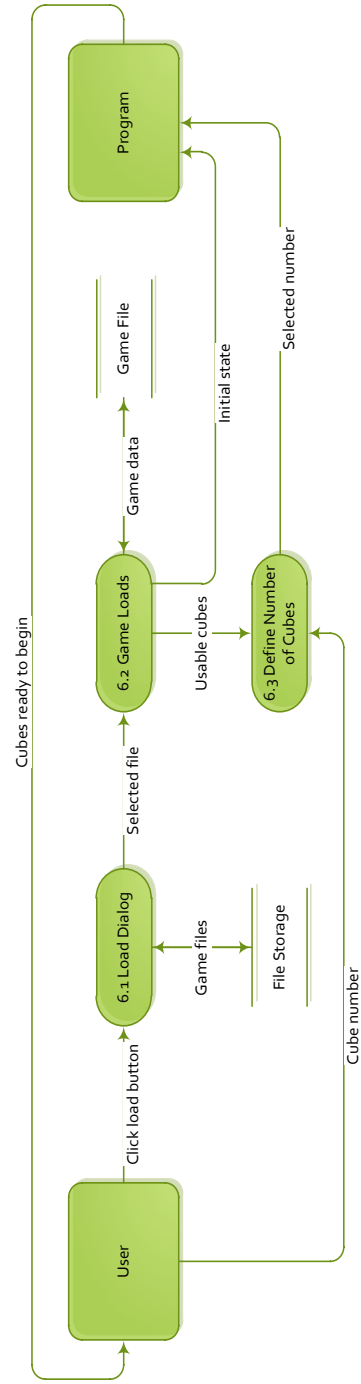
Level 1-4 Data Flow Diagram



Level 1-4 Data Flow Diagram



Level 1-6 Data Flow Diagram



A Features

ID	Feature	Description	Reason
F1	Individual, virtual Sifteo Cube	A virtual representation of a single Sifteo cube	Replicates physical Sifteo Cube
F2	Buttons to manipulate each virtual Cube	Buttons on the virtual Cube will allow the user to flip and tilt it	Replaces physical actions where said actions would be impractical with a mouse
F3	Workspace where multiple cubes can be emulated	Multiple cubes will be displayed on a workspace that replicates the free-form nature of physical Sifteo Cubes	Replicates multiple Sifteo Cubes in a natural, free-form environment
F4	Interactions between Cubes	The Cubes present on the workspace will communicate when they are neighbored	Cubes can simulate the interactions possible with physical Cubes
F5	Load programs into the Cubes	The user will load his own and example programs into the emulators Cubes	The ability to program programs for the emulator is dependent on a common interface
F6	Snap Cubes to invisible grid	The Cubes will snap into an invisible grid when a button is clicked	Increases productivity by allowing a quick reset if the Cubes are in disarray
F7	Zoom Workspace	The Workspace will zoom to the level of an individual Cube or the whole space	Inspecting individual Cubes allows for precise checks of program Graphical User Interfaces (GUIs)

Glossary

Application Programming Interface is an interface implemented by a software program that enables it to interact with other software. 3

Sifteo Cubes are small machines capable of loading programs and interacting with one another as well as responding to predefined movements. 3

References

1. Sifteo Inc. Online: <http://www.sifteo.com>
2. Tim Ekl. Client Meeting. 12 September 2011 12:45 p.m.

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