

Edith Visual Editor

Graham Baker
Walker Bohannon
Steve Marx
Vikram Nilakantan
Jessica Penick
Eli Spiegel

September 30, 2013

Introduction

Edith is educational software designed to introduce new computer science students to programming. New students of any age can learn basic object-oriented programming concepts prior to learning a particular programming language in detail (syntax, data types and structures, etc.). Edith provides a graphical user interface through which users can create a "script" that animates a 2-D character, or sprite, provided by the program. The user creates the script by piecing together provided blocks of program structure in a functional way. Users may create games and share their creations with others. Similar programs (e.g., Alice) have been shown to increase the interest level and retention of students taking their first programming classes. Edith will be written primarily in JavaScript and will be available over the internet. After initial development, the software will be open-source to allow further development and additional educational opportunities.

The Visual Editor (VE) module will provide a visual programming language editor (in essence, an integrated development environment(IDE)). The VE will allow users to arrange programming elements to create an animation sequence; programming elements will include methods, variables, control statements, etc. The VE will, while enforcing syntax rules, convert the program into JavaScript, which will be used by other modules. The VE aims to create an interface that it is easy to use, and following its name will create a view that is always immediately ready to be seen. Since it will be using JavaScript, there will be no time to wait for compiling to see if the code "works," on the view of the end-user. Rather, the code, or sequence of events defined by the user will be always ready to run unless a script notifying the user otherwise.

The VE will be able to directly interact with two other Edith modules, Object Creator and Story Creator, while still being able to run independently. It will provide the Object Creator an interface for defining objects, and the Story Creator an interface for defining animations. In short, the VE will be able to run its own display view and integrate into the views of other Edith modules. The VE will provide not only an interface for the end-user to create their own code, but also for the other modules to implement code provided by the visual editor.

The user will be able to export his program in JavaScript/JavaScript Object Notation (JSON) format. JSON is an efficient data interchange text format that is language independent. The purpose of this is to again encourage learning of coding to our target users – young students who wish to learn more about what they are doing as far as coding, what their changes look like from a lower level than the visual editing.

Use Case 1	Edit variable
------------	---------------

<i>Primary Actor:</i>	End-User
-----------------------	----------

<i>Preconditions:</i>	Add method which does have a variable parameter.
-----------------------	--

<i>Postconditions:</i>	Variable is defined.
------------------------	----------------------

Main Success Scenario:

1. User selects variable
2. User changes the parameter
3. Check type

Extensions:

3.a Invalid type data:

1. Incorrect input.
 - 1.a Boundary warning.
 - 1.b Wrong type.
2. User returns to step 1 or exits.

3.b Compatible type:

1. System accepts input and saves parameter.
-

Non-Functional Requirements Needed:

1. Learning Experience.
 2. Usability.
-

Use Case 2	Dragging and dropping functionality for methods
-------------------	--

Primary Actor: End-User

Preconditions: There is a method for which it is possible to be selected.

Postconditions: Method is now ready to be used.

Main Success Scenario:

1. User creates new variable and selects it.
 2. They can now drag and drop the variable in the boundaries provided.
-

Extensions:

2.a Invalid drop location:

1. The user attempts to drag the variable outside of acceptable boundaries, the variable will no be "locked" inside of boundary.
-

Non-Functional Requirements Needed:

1. Learning Experience.
 2. Usability.
-

Use Case 3	Instantiating a conditional statement
-------------------	--

Primary Actor: End-User; developer

Postconditions: A conditional is instantiated.

Main Success Scenario:

1. A user drags and drops a conditional statement
2. They change the parameter (e.g. if this)
3. The inside of the conditional is then dragged and dropped (e.g. then that).

Non-Functional Requirements Needed:

- Learning Experience.
 - Usability.
-

Use Case 4 Instantiating a Boolean Operator

Primary Actor: End-User

Postconditions: A boolean operator is instantiated

Main Success Scenario:

1. A user drags and drops an operation (e.g. and, or, not)
2. the user sets the two variables or expressions

Non-Functional Requirements Needed:

1. Learning Experience.
 2. Usability.
-

Use Case 5 Connecting actions

Primary Actor: End-User

Preconditions: There are two or more actions on the development board.

Postconditions: The methods are connected.

Main Success Scenario:

1. The method is dragged and dropped by the user above or below the action they want to connect to
2. The user releases the method

Non-Functional Requirements Needed:

- Learning Experience.
 - Usability.
-

Use Case 6 Save a Program

Primary Actor: End-User

<i>Preconditions:</i>	Add method which does have a variable parameter.
<i>Postconditions:</i>	Variable is defined.
<i>Main Success Scenario:</i>	
<ol style="list-style-type: none"> 1. The user selects save this adds the current development board to a list that the user can access 	
<i>Extensions:</i>	
2.a Unnamed program: <ol style="list-style-type: none"> 1. The user will name the program 	
<i>Non-Functional Requirements</i>	<i>Re-Needed:</i> <ul style="list-style-type: none"> • Usability.
Use Case 7	
Delete a method	
<i>Primary Actor:</i>	End-User
<i>Preconditions:</i>	There are methods on the development board
<i>Postconditions:</i>	Selected methods are deleted
<i>Main Success Scenario:</i>	
<ol style="list-style-type: none"> 1. The user selects a method or group of methods 2. The user selects to delete the selected items 	
<i>Extensions:</i>	
2.a Invalid type data: <ol style="list-style-type: none"> 1. Incorrect input 2. User returns to step 1 or exits 	
<i>Non-Functional Requirements</i>	<i>Re-Needed:</i> <ul style="list-style-type: none"> • Learning Experience. • Usability.
Use Case 8	
Run the Program (play)	
<i>Primary Actor:</i>	End-User
<i>Preconditions:</i>	Methods have been added to the development board.
<i>Postconditions:</i>	The program has been run and the state is maintained.
<i>Main Success Scenario:</i>	

1. user selects the play button
2. the program is compiled and if there are no errors the program is run.

Extensions:

2.a Compile time errors:

1. Does not run the program
2. Highlights error for user

Non-Functional Requirements Needed:

- Learning Experience.
 - Usability.
-

Use Case 9

Pause the Program

Primary Actor:

End-User

Preconditions:

The program is running.

Postconditions:

The state of the program when it was paused is maintained.

Main Success Scenario:

1. the user pauses the program
2. the program stops and maintains the current state

Non-Functional Requirements Needed:

- Learning Experience.
 - Usability.
-

Use Case 10

Instantiating a Loop

Primary Actor:

End-User

Preconditions:

Add method which does have a variable parameter.

Postconditions:

A loop is instantiated

Main Success Scenario:

1. The user drags and drop a loop to the development board
2. The user then inputs the conditionals for the loop and its exit conditions.

Extensions:

2.a Invalid input:

1. User returns to step 1 or exits
-

<i>Non-Functional Requirements</i>	<i>Re-Needed:</i>	<ul style="list-style-type: none"> • Learning Experience. • Usability.
------------------------------------	-------------------	--

Use Case 11	Creating a new Action
Primary Actor:	End-User
Preconditions:	None.
Postconditions:	If first method, the box is made, if attaching to another method, the boxes are connected
Main Success Scenario:	
<div>1. The user selects the new method button</div> <div>2. Drags the method into the workbox</div> <div>3. then the method prompts the user to give arguments for that specific action</div> <div>4. If arguments are compatible, the method is created</div>	
Extensions:	
<div>2.a Invalid input:</div> <div>1. User prompted to re-enter arguments</div>	
Non-Functional Requirements	Re-Needed: <ul style="list-style-type: none">• Learning Experience.• Usability.

Use Case 12	Connecting actions
Primary Actor:	End-User
Preconditions:	There are two actions on the development board.
Postconditions:	The methods are connected
Main Success Scenario:	
<div>1. The action is selected by the user</div> <div>2. The action is dragged above or below the action they want to connect to</div> <div>3. Release to connect</div>	
Extensions:	
<div>2.a Invalid Action Placement:</div> <div>1. If the user misses the action while dropping another one on it or the user drops the action in a place out of the frames range, the action will be returned to where it got picked up from.</div>	

<i>Non-Functional Requirements</i>	<i>Re-Needed:</i>	<ul style="list-style-type: none"> • Learning Experience. • Usability.
------------------------------------	-------------------	--

Use Case 13	Save a collection of methods
--------------------	-------------------------------------

<i>Primary Actor:</i>	End-User
-----------------------	----------

<i>Preconditions:</i>	There is a method to be saved on the board.
-----------------------	---

<i>Postconditions:</i>	The method is saved
------------------------	---------------------

Main Success Scenario:

1. The user selects the method or the set of actions that they want to save. The method gets highlighted
 2. The user clicks the save button
 3. Method is added to list of actions that the User can access.
 4. User is prompted to name method
 5. Method is created after it is named
-

Extensions:

2.a Invalid Action Sequence:

1. If the user selects the set of actions, and then clicks somewhere other than the save button, the set of actions becomes deselected
-

<i>Non-Functional Requirements</i>	<i>Re-Needed:</i>	<ul style="list-style-type: none"> • Learning Experience. • Usability.
------------------------------------	-------------------	--

Use Case 14	Delete a Method
--------------------	------------------------

<i>Primary Actor:</i>	End-User
-----------------------	----------

<i>Preconditions:</i>	There is a method to be deleted on the board.
-----------------------	---

<i>Postconditions:</i>	The method is dleted
------------------------	----------------------

Main Success Scenario:

1. The user selects the method or the set of actions that they want to save. The method gets highlighted
 2. The user clicks the delete button
 3. Method is deleted
-

Extensions:

2.a Invalid Action Sequence:

1. If the user selects the set of actions, and then clicks somewhere other than the delete button, the set of actions becomes deselected

<i>Non-Functional Requirements</i>	<i>Re-Needed:</i>	<ul style="list-style-type: none">• Learning Experience.• Usability.
------------------------------------	-------------------	---

Non-Functional Requirements

Usability

Training should not be required for users to effectively use the module. Module documentation and basic age-specific computer knowledge should provide sufficient guidance. The module should allow the user to recover from errors with informative and understandable error messages.

Documentation

The module will provide documentation that allows users to easily begin using the system.

Modifiability

The module will have the flexibility to allow feature expansion over time.

Privacy

The user's work will remain private/secure unless the user chooses to share it.

Learning Experience

In order to support the learning of young computing students, the module will provide a sufficiently "pleasant" interface.

Platform

Users will be able to run the module from Windows or Mac

Open Source

After initial development, the source code will be open and redistributed with improvements by anyone.
