

Cognitive Walkthrough Form

Briefly describe the system being evaluated:

Software: ALVIS Live!
ALVIS is a graphic programming application for novices. It only works on Windows. In this application, users can create arrays, variables and use other functions to achieve simple algorithms.

Briefly describe the target users of this system (background, experience, etc.):

Students or people who have no programming experience.
Students or people who just start to learn the basic knowledge of programming.

Briefly describe the task(s) to be evaluated:

We are evaluating the tasks of using a loop algorithm to find the max value of an array.
We need to create an array first. In this array, there are 6 cells and each of them randomly stored an integer. Then, choose a proper algorithm to find the max value of this array.

Task 1: Create an array

Task Steps for Task 1	Will the user know what to do next to make progress?	Will the user notice how to perform the correct action?	Will the user interpret the system response correctly?
1.1 Click "Create Array" button	Yes. After clicked the "Create Array" button, there will pop-up a box to tell users what to do next.	Yes, the content in the pop-up box is clear.	Yes. When the button is clicked, it turns into a darker color. An "Alvis help" pop-up box will show up.
1.2 Click in the animation window and drag the mouse.	User just finish creating an array.	No, there is not a sign that shows where is the "animation window".	Yes. When user click in the animation window, an array will be created. The length of the array changes while user drags the mouse.

Task 2: Populate the Array

Task Steps for Task 2	Will the user know what to do next to make progress?	Will the user notice how to perform the correct action?	Will the user interpret the system response correctly?
2.1 Click "Populate" button.	Yes. After clicked the "populate" button, there will pop-up a box to tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. When the button is clicked, it turns into a darker color. An "Alvis help" pop-up box will show up.
2.2 Click the array.	So far, users have populated the array with variables	Yes. Users can populate the array by clicking the array.	Yes. The array will be filled by randomly generated integers if users click the array.

Task 3: Create a "maxsofar" variable

Task Steps for Task 3	Will the user know what to do next to make progress?	Will the user notice how to perform the correct action?	Will the user interpret the system response correctly?
3.1 Click "Create Variable" button.	Yes. After clicked the "Create Variable" button, there will pop-up a box to tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. When the button is clicked, it turns into a darker color. An "Alvis help" pop-up box will show up.
3.2 Click in the "Animation Window".	No. A variable will be created by clicking in the "Animation Window", but users will not know how to change the name of this variable.	No. Users may not know the location of the "animation window".	Yes. A variable will be created successfully by clicking in the animation window.
3.3 Change the name of the variable.	After this step, a "maxsofar" variable has been created.	No, there is not a clear notification for users to change the name of the variable. Users need to figure it out by themselves.	If users figure out how to change the name of variables, they will interpret the system response correctly since they can see the name has been changed.

Task 4: Create an array index

Task Steps for Task 4	Will the user know what to do next to make progress?	Will the user notice how to perform the correct action?	Will the user interpret the system response correctly?
4.1 Click "Create Index" button	Yes. After clicked the "Create Index" button, there will pop-up a box to tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. When the button is clicked, it turns into a darker color. An "Alvis help" pop-up box will show up.
4.2 Click the first cell of the array.	So far, the array index has been created successfully at the first cell of the array.	Yes. Users can create index by clicking the array.	Yes. There will be a little red triangle above the cell user just clicked on. The name of the index is "i1".

Task 5: Create iteration

Task Steps for Task 5	Will the user know what to do next to make progress?	Will the user notice how to perform the correct action?	Will the user interpret the system response correctly?
5.1 Click "Iterate Loop" button.	Yes. After users click the "Iteration Loop" button, there will pop-up a box to tell users what to do next.	Yes. the content in the pop-up box is clear	Yes. When the button is clicked, it turns into a darker color. An "Alvis help" pop-up box will show up.
5.2 Click on the index and drag it to the last cell of iteration.	After doing this step, an iteration has been created.	Yes. Users will know how to create iteration by following the pop-up box.	Yes. If users tend to click wrong place, there will be a red "X" under the cursor. After clicking on the index and dragging it successfully, a "while" loop will be shown in the "Script editor" window.

Task 6: Create "if" statement

Task Steps for Task 6	Will the user know what to do next to make progress?	Will the user notice how to perform the correct action?	Will the user interpret the system response correctly?
6.1 Click "If" button.	Yes. After clicking the "If" button, there will pop-up a box to tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. When the button is clicked, it turns into a darker color. An "Alvis help" pop-up box will show up.
6.2 Click on an array cell to place on the left-hand side of the if statement.	Yes. After clicking a variable, a pop-up box will tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. After clicked one cell, there will pop up a box for clarification of x.
6.3 Clarify what x is.	Yes. After clarifying what x is, a pop-up box will tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. After clarifying what x is, there will pop up another box. If users clicked "cancel" button, the pop-up box will close, and this step will stop.
6.4 Choose a condition operator.	Yes. After users choose a condition operator, a pop-up box will tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. After users choose a condition operator, there will pop up another box. If users clicked "cancel" button, the pop-up box will close, and this step will stop.
6.5 Choose a variable for right-hand side of if statement.	After this step, a "if" statement has been created.	Yes. the content in the pop-up box is clear.	Yes. Users can set a number for RHS of if statement or select a variable by clicking that variable. If users tend to click wrong place, there will be a red "X" under the cursor. After doing these steps, a "if" condition expression will be shown in the "Script editor" window.

Task 7: Set maxsofar variable to store the current max value of the array

Task Steps for Task 7	Will the user know what to do next to make progress?	Will the user notice how to perform the correct action?	Will the user interpret the system response correctly?
7.1 Click "Set" button.	Yes. After clicking the "Set" button, there will pop-up a box to tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. When the button is clicked, it turns into a darker color. An "Alvis help" pop-up box will show up.
7.2 Click on a variable or array element whose value is to be set.	Yes. Users need to click the variable or array element whose value is expected to be set.	Yes, it is clear.	Yes. After clicking the variable or array cell, there will pop up a box asking clarification of X.
7.3 Clarify what X is.	Yes. After clarifying what x is, a pop-up box will tell users what to do next.	Yes. the content in the pop-up box is clear.	Yes. After clarifying what x is, there will pop up another box. If users clicked "cancel" button, the pop-up box will close, and this step will stop.
7.4 Clarify what Y is.	After doing this step, maxsofar variable will store the larger number users get through "if" condition expression.	Yes. Users need to click the variable that users want it to be Y.	Yes. the result will be shown in the "Script editor" window. In this case, it will be "set a1[i1] to maxsofar".

Task 8: Execute the algorithm

Task Steps for Task 8	Will the user know what to do next to make progress?	Will the user notice how to perform the correct action?	Will the user interpret the system response correctly?
8.1 Click "Step forward" or "play forward" to execute the algorithm.	It depends. If users know the meaning of these arrow icons, they probably know how to execute the algorithm. Otherwise, users probably don't know how to execute the algorithm since the signifiers of these icons are implicit.	There is not a clear signifier for users to execute algorithms. Since this software is developed for people who have no experience of programming, users probably will not notice how to perform correct action.	After clicking "play forward" button, users will see maxsofar variable is updating until the iteration finished. Then the value stored in maxsofar variable is the max value in this array.

Summary of results:

Aspects of design that worked:

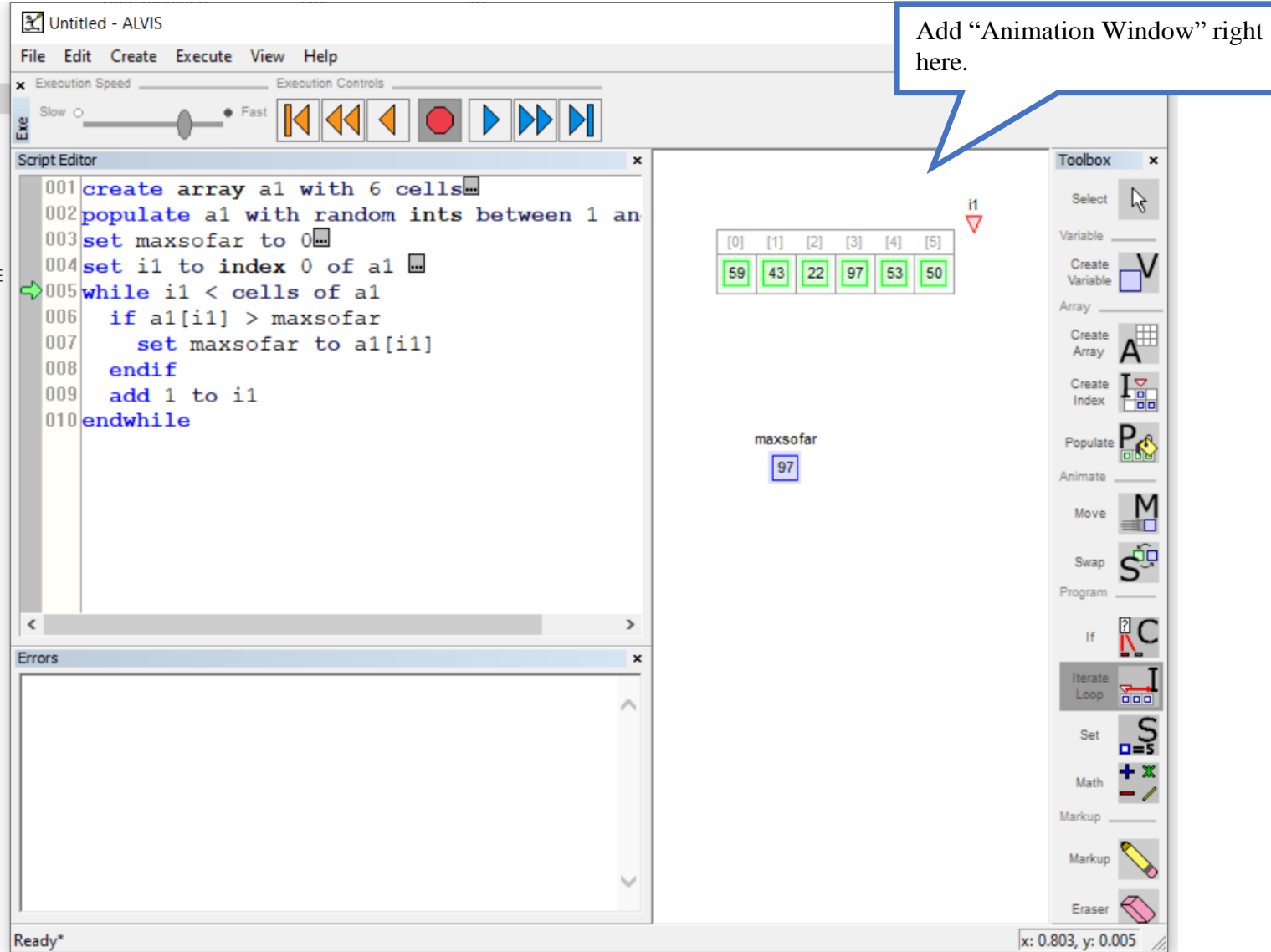
1. Buttons under "toolbar" are clearly labeled. Developer used a combination of plain text symbols and graphic icons to express their purpose.
2. Developer also provided additional comments when the cursor hovers over all buttons and icons. When they are selected, when an image indicates the position related to the action in the animation window, it will be brought around by the cursor. This is a flag indicating that the required action has been selected and that the next step can be completed by dragging and dropping the image into the animation window. When users click an icon, an image appears on the cursor, when the cursor is on the animation window, the image is visible on the cursor, but if the cursor is outside the animation window, the image does not exist. This will let users know that the operation is valid in the animation window and not elsewhere.
3. When the action is placed on the animation window, a new image appears in the window and is removed from the cursor. This is a clear indication that the operation completed successfully.
4. After each successful operation, content in "Script Editor" window is clear. It will also let users know whether their action is right or not.

Potential usability issues:

1. Users might have trouble with finding "animation window". There is no clear signifier of animation window.
2. Users might not notice that the name of variables and other things that users create can be edited by double clicking the image.
3. "Execution controls" is not easy to see. Probably users will not figure out how to execute the program.
4. When user tend to click wrong place, for example, a user tends to click a cell rather than an index when he/she wants to create an iteration, there is a red "X" under cursor. However, it is not that obvious, and after users click wrong place, nothing happens, users may not notice he/she just did wrong action.

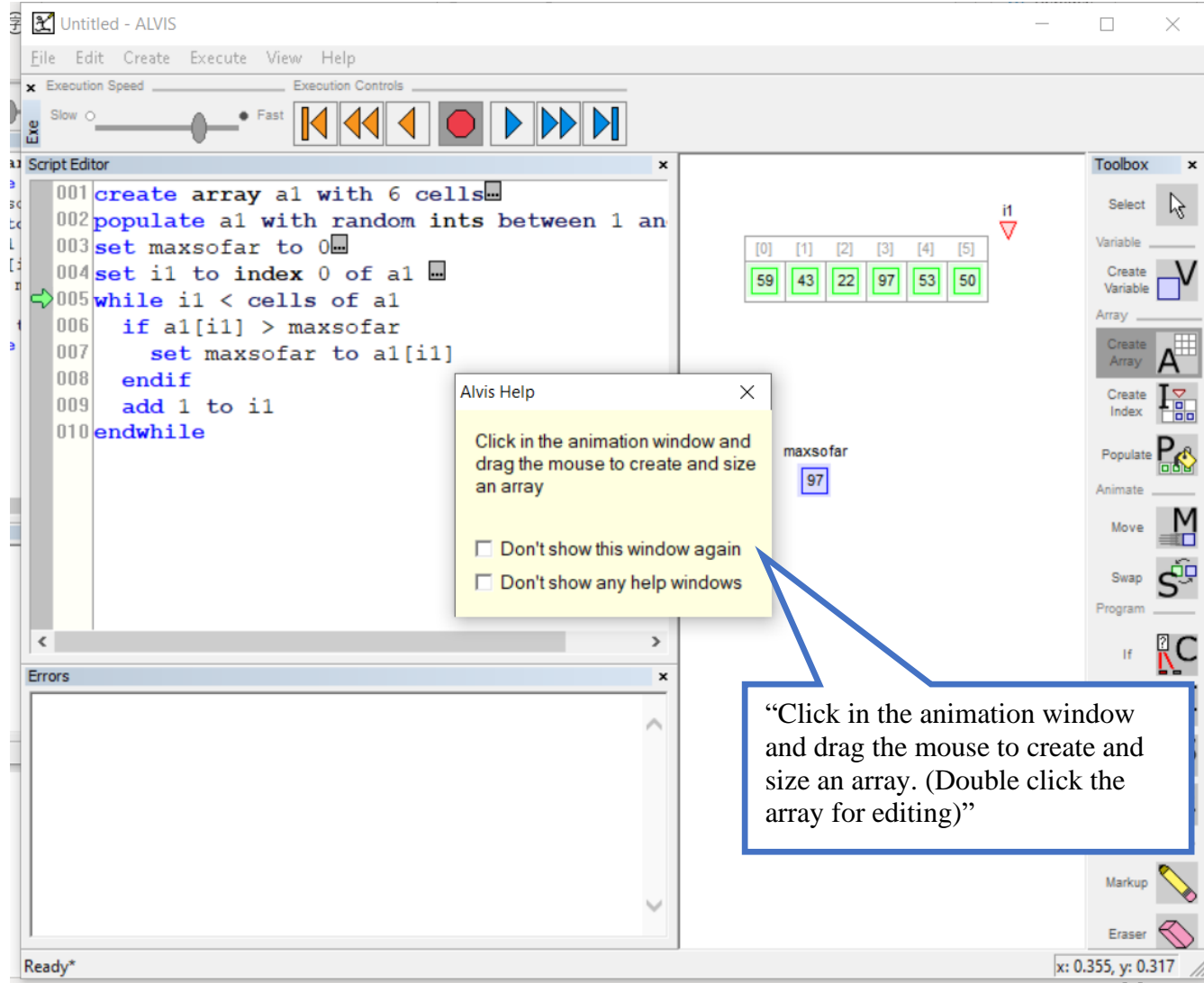
Proposed Design Changes:

1. Add a clear signifier right above the "animation window".



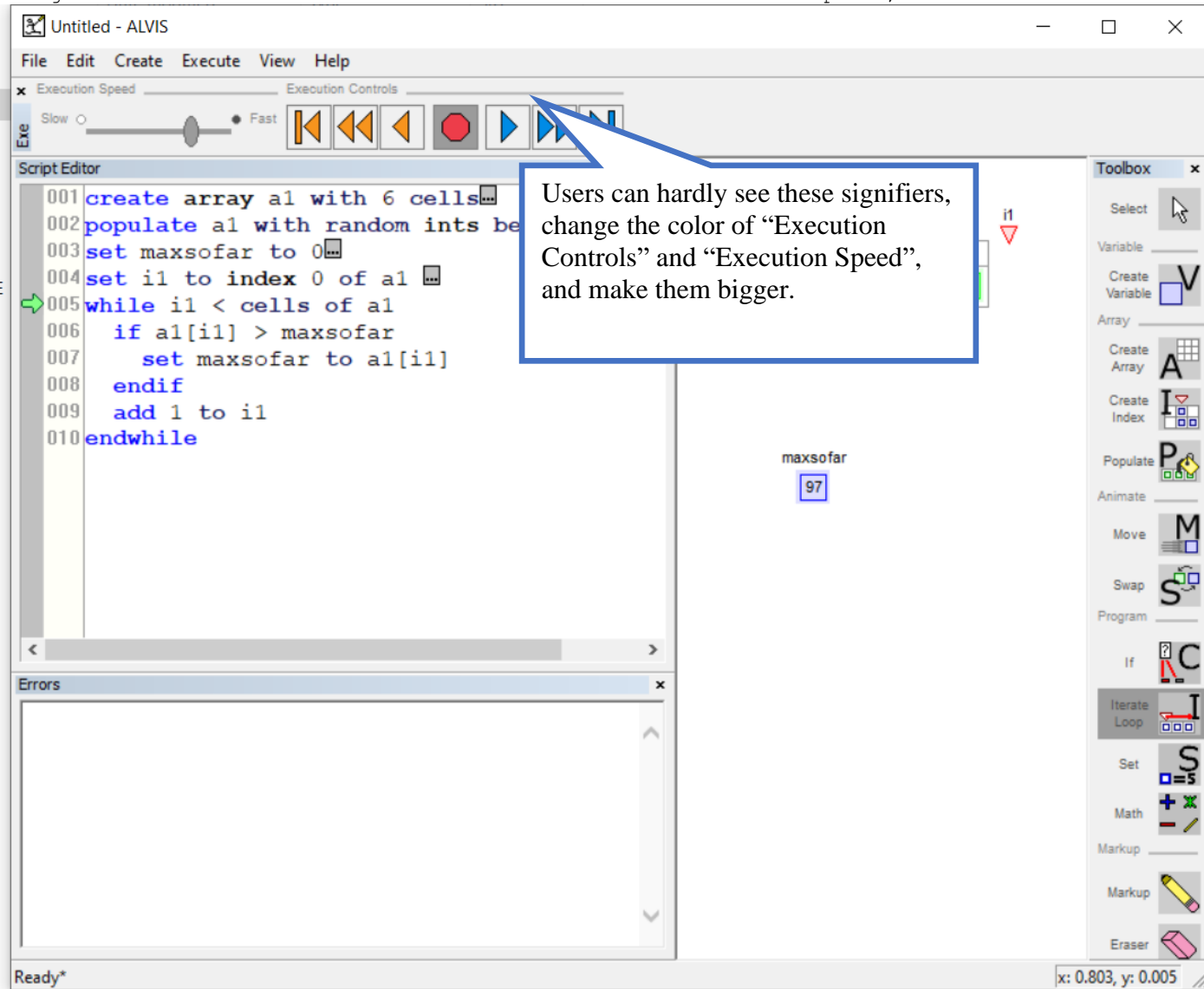
In this case, users will easily find "animation window" and know how to create an array or a variable.

2. The content in the pop-up box can be more detailed. Such as, "Click in the animation window and drag the mouse to create and size an array. (Double click the array for editing)"



In this case, users will know they can double click the array in order to edit it. Also, this suggestion is suitable for creating variables.

3. Change the size and color of "Execution Controls" and "Execution Speed", make it clearer to see.



4. After users click the wrong place, there is no notification that tells users the right action. A pop-up box can be added after users clicked wrong place. For example, I just clicked "Iterate Loop" button, I was supposed to click the index, but I clicked somewhere else. A pop-up box can show up now to tell me that I should click an index and drag it to the last cell of iteration.

