AE2GRP Interim Group Report

ANIMATION OF SORTING ALGORITHMS: DOMINO

November 24, 2016

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2.1 Technical research

1. For platform, we choose PC to be our main operating platform. One side of the reason we choose PC is the limited personal programming ability. We dont have experience in mobile application developing. Therefore, developing on other platforms may take us a lot of time to learn a new programming skill and the outcome may not be guaranteed either. Another reason is that although PC is not so convenient as mobile device, it has own advantage. User may not care the space that a small application occupies, but in mobile device, because of the limited storage, a small application may cause the mobile phone running slowly. For different operating system, we choose window rather than IOS and other system. According to a research from StatCounter Global Stats, from 2015 to 2016, the number of Windows users still constitute a high proportion of PC users. This situation happens not only in China, but also in the whole world. Therefore, its better for us to develop for the majority.

2. For developing tools, we use eclipse to be our program editor and compiler because we learn a lot skills about eclipse in class and its also convenient for us to test our code using Junit. We choose Java scene builder, which can also be used in eclipse, as our GUI designing tools. This software have a visualization of interface designing. It is more convenient for us to drug the function part into a visual interface rather than just write abstract code.

3. The reason why we choose Java as our programming language is that we learn more about that language in class and get more familiar with it. Our supervisor can also give us more suggestion about Java programming.

2.2 Market Research

Comparing to other software, there are 4 advantages. First, as an open-source software, everyone can use Domino free. For target user, student, its user friendly. By contrast, Algorithms App is a similar application which charge for $4.99 for Mac version. URL: https://itunes.apple.com/us/app/algorithms-app/id577563313. Secondly, this kind of tutorial software is rarely in windows desktop platform. Domino has two platforms web and windows. It fit the requirement of online user and offline user without using network. Meanwhile, in comparing page, Domino provide users acknowledge not only

comparison efficient of different sorting algorithms but also one sorting algorithms efficiency when random input number increase. The efficiency compared to algorithms itself is a significant way to understand and this part are not included by other similar software. Finally, Dominos interface is easy to let users to concentrate on animation and the center of screen instead of moving slight between animation and code. The appropriate place of different block is comfortable for users to use. There is a bad example in https://visualgo.net/sorting.

3 Requirement Specification

4 Design

5 Implementation

This section introduces the basic prototype and give a particular introduction of this software. More specifically, prototypes have been done including toolbar, sorting window and comparison window. The software is based on response type so that each sectional window can change its size. Response type make the software more reasonable.

5.1 Main Page

1. main frame
   For the main frame of the sorting algorithm animation, the interface is divided into 5 parts. Each of these 5 parts is not independent.
   The main part is the animation. This part include several data and the geometric figure generated by them. When program is running, they will move on the basis of algorithm codes. The place changing can easily explain how the selected algorithm works.
   The second part, which is under the animation, is control function. It contains 5 functional buttons and they work together to control the animation of algorithm. The first button on the left-up corner of this part is the play-stop button. When the stop button is click, the animation will freeze at the present step. Then the stop button will become the paly button. The animation will not continue the rest step until the play button is clicked.
   The controller on the right side of the play-stop button is progress line. User can drug the button on the line to control the progress of animation. The animation will stop at differential steps with differential positions.
   The button at the lower left corner is the speed bar. The speed input box is on the right side. These two controllers is used to control the speed of animation. User can change the speed of figure moving through drugging the control line or inputting an integer level from 1 to 10.
   The last button at the lower right corner in this part is shape chosen box. User can choose or change the shape of figures in this choose box. Several figures such as rectangle, triangle and circle are provided for users. This function will not influence the process of algorithm code running.

2. Algorithm Setting Block
   Sorting algorithms are able to selected in a scrollbar. The sequence of sorting algorithms is Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort, Heap Sort, Bucket Sort according to the difficulties increasing. The default algorithm is Bubble Sort. When the algorithm selected, users can click the Start button to start.
   Users can not able to change the input and the number of inputs considering two

aspects. On one hand, it makes no sense if users specify a serial of same numbers or increasing numbers. One the other hand, considering the users experience, if user input too many numbers, it will affect user experience due to long waiting time.

3. Comment Block
   It connects to the amination and running code block. The comment shows the explanation of running code concurrently.

4. Running Code Block
   It connects to the amination and comment block. It shows the Java code running according the step of animation.

5.2 Comparing Part

Comparing sorting algorithms is another section of the software. In the right hand side there is a selection part where users can select which two algorithms to compare. After choosing the algorithms, the main part change to two single parts which locate in left and right side. Each part is an independent part which has its own animation process.

In each of the animation part, the total time will show in the top of the window, below the sorting graph, it shows the name of the sorting algorithm.

Two algorithms both have the same default input and start in the same time after pressing the Start button. In the right hand side, below the algorithm choosing window there is a part which can show the complexity of the algorithms which is comparing in the main window. After the comparing process, the efficiency line chart of different sorting algorithms in a clear pattern.

Optional The main requirement only provides two algorithms to compare, so the comparison windows maybe larger. Users can choose how many algorithms they want to compare. The right hand side windows function should also change because of the number of windows become larger.

6 Progress Report

This section mainly covers 3 parts, progress we made, problems we met and our time plan. The first subsection summarizes the progress we made so far, the second subsection discusses some problems encountered, including both technical and management issues, and the third subsection talks about the future time plan of the project.
Reference Example[**?**]

6.1 Progress to date

As mentioned in the previous sections, a portion of this project is dedicated to research and investigation in order to elicit the requirements, best technologies for the job and conduct some feasibility studies on past existing or novel solutions that solve some part(s) or all of the problem. It is therefore important to emphasize the role these play and their sizable contribution to the progress made. The progress thus far is as follows:

1. **Project Website:** The project website is using Jekyll and is free hosting in GitHub Pages, which link is `grapeUNNC.github.io`. The website provide basic introduction of the project and the team role.

2. **Requirements Specification:** The Functional and Non-Functional requirements specifications were determined and enumerated. The elicitation of these specifications had an effect on the time frame of the project such that it necessarily had to be adjusted to account for further research and implementation components.

3. **System Design:** Given the requirements of the system, it was necessary to formulate a design which would be followed in the implementation of the system. This also added to the direction of the project so that the Feasibility Study and Prototyping stages were better informed with respect to suitability.

4. **Feasible Study:** An evaluation of current novel and existing technologies and systems is made in order to best determine the extent to which they solved the problem(s) outlined in the Specifications. A decision was also made on which of these would be used in order to progress with this project and solve the problems outlined therein.

5. **Prototype:** Basic prototyping was done following the designs of the system to trial run some of the technologies chosen for parts of the project and evaluate the scope, direction and projections of the project.

6.2 Problems encountered

6.3 Time plans for the next half

The second half of the cycle will be composed largely of implementation, testing and debugging steps in order to realize the design.

7 Appendices