**4.n.1** Procedure Subpage

The procedure subpage is shown in Figure xxx. The interface design is divided into two parts: Basic Operation for Each Subpage and Subpage Design.

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1. Basic Operation for Each Subpage
   * Home button

The home button is on the top-left corner of the software, and it is used to back to the procedure main page. Users click the home button to return.

* + Page Menu Bar

The page menu bar is on the top of the software, and it is used to select subpages. There are three menu items, which are the introduction, operation, and implementation. When users click one of the menu items, the corresponding subpage is chosen, and this button will be highlighted with a light white underline.

* + Page Panel

The page panel is under the page menu bar, and it is used to show the content corresponding to the menu item. Users click on different menu items to change the contents of the page panel.

1. Subpage Design
   1. Introduction

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* + Introduction Card

The introduction card is on the left side of the page panel, and it is used to demonstrate the brief concept and basic implementation approach of a sorting algorithm. Users may have a general understanding of the sorting algorithm through the content in the introduction card.

* + Algorithm animation

The algorithm animation is on the right side of the page panel, and it is used to display the example array sorting process. Users can control the animation’s playback through the progress bar at the bottom and see the explanation of each step in the white explanation box.

* 1. Operation

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* + Input Bar

The input bar is at the top of this subpage, and it is used to collect the user input. It consists of a textarea tag for entering input lists (positive integers from1 to 30), a create button to confirm the input list, and a shuffle button to generate a valid input list randomly. Users have two methods to generate input. One is to enter the valid numbers by themselves. Another is to click the shuffle button to get a random valid list. After the input is generated, users click the create button to get integer bars in the animation below based on the input. If users enter an invalid input, there will be an error message under the input bar, and the integer bars in the animation will not change based on the invalid input.

* + Algorithm animation

The algorithm animation is under the input bar, and it is used to display the sorting process of the user’s inputs. Users can control the animation’s playback through the progress bar at the bottom and see the explanation of each step in the white explanation box.

* 1. Implementation

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* + Pseudocode card

The pseudocode card is on the left side of the page panel, and it is used to show the pseudocode of a sorting algorithm. When the right-side animation plays, the pseudocode corresponding to the animation step will be highlighted. Users may have a general understanding of how to implement the sorting algorithm in pseudocode.

* + Export button

The export button is located at the bottom of the pseudocode card, and it is used to export a PDF file containing learning notes of the algorithm. Users may click on the button to download the notes written by developers.

* + Algorithm animation

The algorithm animation is on the right side of the page panel, and it is used to display the example array sorting process. Users can control the playback of the animation through the progress bar at the bottom and see the explanation of each step in the white explanation box and the corresponding pseudocode in the left-side pseudocode card.