

1 **IS3108 Full-Stack Software Engineering for AI Solutions II**
 2 **Lab 1**
 3 **Creating Layouts Using HTML And CSS**

5 ***Learning Objectives***

7 At the end of this lab, you should be able to:
 8 1. Create layouts using HTML and CSS.
 9 2. Work with the Bootstrap CSS framework.
 10 3. Work with HTML/CSS templates.
 11 4. Publish static website to the World Wide Web (WWW).

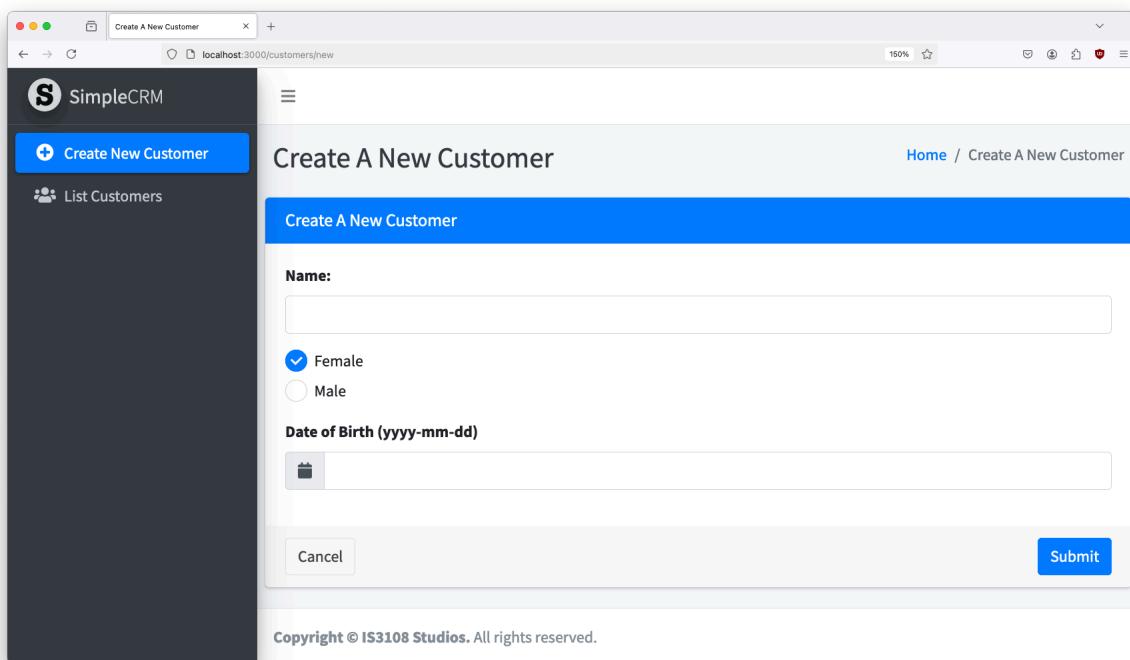
13 When copying the source code from the PDF file, the formatting of the code may be lost.
 14 Make sure you format your codes properly. Remember to backup your project files from this
 15 lab as you will need to use it again for subsequent labs.

16 **Simple Customer Relationship Management (CRM) System**

17 In the lab exercises, we will be building a simple Customer Relationship Management (CRM)
 18 system using different technologies (backend and frontend). This system should allow users
 19 to manage a list of customer records.

21 This system will be built over a course of multiple lab sessions. We will focus mainly on
 22 creating the layout for this lab. In this lab, you will learn about how to create a simple HTML
 23 document manually, use templates to create layouts, and finally publish websites to the
 24 WWW.

25 Figure 1 shows some sample screenshot of how the layout might look like at the end. Please
 26 note that these are just sample screenshots, the final version might look different.



Id	Name	Gender	DOB	Created	
676ee591d2556da259a57a56	John	Male	01/01/2000	27/12/2024	
676ee612d2556da259a57a57	Jack	Male	03/02/2001	27/12/2024	
676eebf4ffb7851ecec932bc	Eric	Male	03/02/1997	27/12/2024	
676eec08ffb7851ecec932bd	Eric	Male	03/02/1997	27/12/2024	
676f02f9d1509b35a01fb4df	James	Male	03/02/1997	27/12/2024	
Id	Name	Gender	DOB	Created	

Figure 1 – Sample screenshots

There are 2 main pages for this CRM system: a page to create/edit a customer record and a page to list customers. For this lab, we will develop the pages progressively so that you can better appreciate the different technologies. We will start by creating the page using HTML/CSS manually before adopting CSS frameworks and HTML templates for this purpose. If you are not already using a coding editor, you are encouraged to use Visual Studio Code (<https://code.visualstudio.com/>) for writing your code in this course. For this lab, you will be learning how to create the page(s) from scratch before incorporating an HTML template.

Task 1: “Create A New Customer” Page

For this section, we will focus on writing the “Create A New Customer” page. Try creating the following page (Figure 2).

Create A New Customer

Name:

Gender: Female Male

Date of Birth (yyyy-mm-dd):

Figure 2 – Basic “Create A New Customer” page

1 When creating your page, ensure that you enclose your form using the `<form></form>`
 2 tag and use `<label></label>` for the different fields. You should also ensure that the
 3 “Female” and “Male” radio buttons are grouped together so that the user cannot select both at
 4 the same time.

5
 6 *Tip: VSCode comes with **Emmet** support. Try using the ! alias¹ to easily create a skeleton of*
 7 *the webpage rather than typing out all the HTML tags manually.*

8
 9 **Question 1: Practically speaking, what is the purpose of using the `<label></label>`**
 10 **tag?**

11
Task 2: Simple Layout Using HTML Tables

12 For task 2, we will be learning how to use HTML tables to create a simple layout for the
 13 “Create A New Customer” page. Try enhancing your page such that the page adopts a 2-
 14 column layout, and the form elements are properly aligned on the second column.
 15 Furthermore, ensure that the “Submit” button is aligned to the right. See Figure 3 for an
 16 example.

The screenshot shows a web browser window titled "Create A New Customer". The page content is as follows:

Create A New Customer

Name:

Gender: Female Male

Date of Birth (yyyy-mm-dd):

Cancel **Submit**

18
 19 **Figure 3 – “Create A New Customer” page with a simple layout**
 20

21 *Tip: Try using Emmet to create the table structure rather than typing out the table-related*
 22 *tags manually.*

23
Task 3: Simple Site Layout

24 For this task, we will create a simple layout for our CRM system containing multiple pages.
 25 Update the “Create A New Customer” page to include a left sidebar and shift the form to the
 26 right section. For this purpose, consider using `<div></div>` tags and the `float` and
 27

¹See <https://docs.emmet.io/cheat-sheet/> for a cheatsheet of Emmet.

1 width CSS properties to achieve this. For the left sidebar, use an unordered list
 2 (

)(See Figure 4).

The screenshot shows a web browser window with the title 'Create A New Customer'. On the left, there is a sidebar with a bulleted list: 'Create A New Customer' and 'List Customers'. The main content area is titled 'Create A New Customer' and contains form fields: 'Name:' with an input field, 'Gender:' with radio buttons for 'Female' and 'Male', and 'Date of Birth (yyyy-mm-dd)' with an input field. At the bottom are 'Cancel' and 'Submit' buttons.

3
 4 **Figure 4 – “Create A New Customer” page with sidebar**
 5

6 Next, we will remove the bullet points of the unordered list items by specifying the following
 7 CSS properties for the tag.

```
8 list-style-type: none; padding: 0;
```

9
 10 You might want to reduce the width of the sidebar accordingly and add some padding to the
 11 sidebar <div></div>. The final version should look something like Figure 4. Try creating
 12 a dummy page for the “List Customers” hyperlink to ensure that there are no broken links.

The screenshot shows a web browser window with the title 'Create A New Customer'. The sidebar now contains a single line of text: 'Create A New Customer List Customers'. The main content area is identical to Figure 4, with fields for Name, Gender (radio buttons for Female and Male), and Date of Birth, and 'Cancel' and 'Submit' buttons.

13
 14 **Figure 5 – “Create A New Customer” page with sidebar and some styling**
 15

16 **Task 4: Using Bootstrap For Styling**

17 For the “Create A New Customer” page, since we are using <table></table>, the page
 18 always shows a 2-column even for smaller devices (ideally we want to stack the elements as a
 19 single column instead for smaller devices) (Figure 6). We will address this issue by setting
 20 our pages to use Bootstrap.

The screenshot shows a web browser window titled "Create A New Customer". The URL in the address bar is "file:///Users/leksian/NUS". The page content includes a header with "Create A New Customer" and "List Customers" links. Below this is a large, bold title "Create A New Customer". The form fields are arranged in a grid: "Name:" with an input field, "Gender:" with radio buttons for "Female" and "Male", and "Date of Birth (yyyy-mm-dd)" with an input field. At the bottom are "Cancel" and "Submit" buttons.

Figure 6 – Create A New Customer Page On Smaller Devices

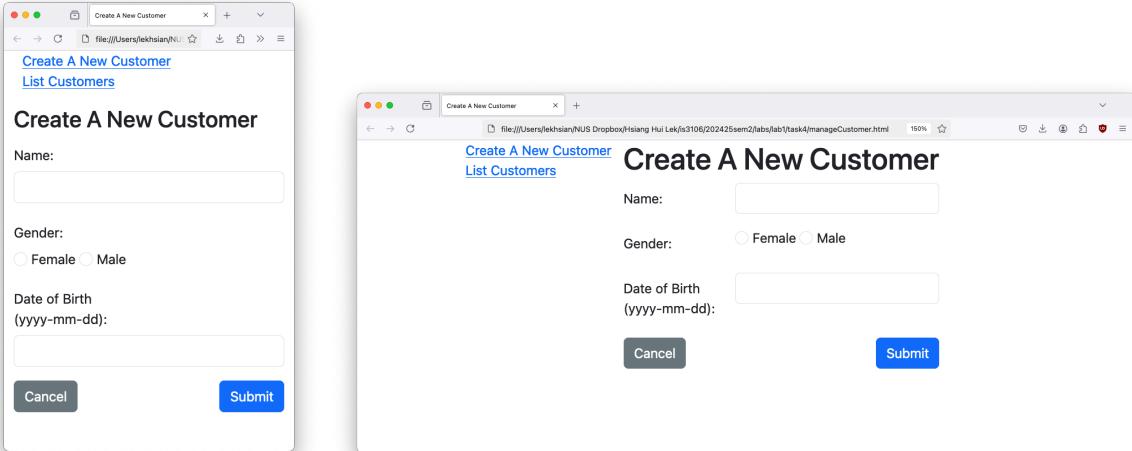
Set up your pages to use Bootstrap (<https://getbootstrap.com/docs/5.3/getting-started/introduction/>). You will immediately see the difference in the typography once Bootstrap is set up (Figure 7).

The screenshot shows the same "Create A New Customer" page after Bootstrap has been applied. The overall design is more polished and modern. The title "Create A New Customer" is centered at the top in a large, bold font. The navigation links "Create A New Customer" and "List Customers" are now in blue. The form fields are styled with a consistent look: "Name:" with an input field, "Gender:" with radio buttons, and "Date of Birth (yyyy-mm-dd)" with an input field. The "Submit" button is now a prominent blue button, while the "Cancel" button remains grey. The entire page is contained within a light gray box with rounded corners.

Figure 7 – How Pages Look Like After Setting Up Bootstrap

Modify the <table></table> implementation of the “Create A New Customer” page to use Bootstrap grid and form elements (<https://getbootstrap.com/docs/5.3/forms/overview/>) further enhance the UI of the “Create A New Customer” page.

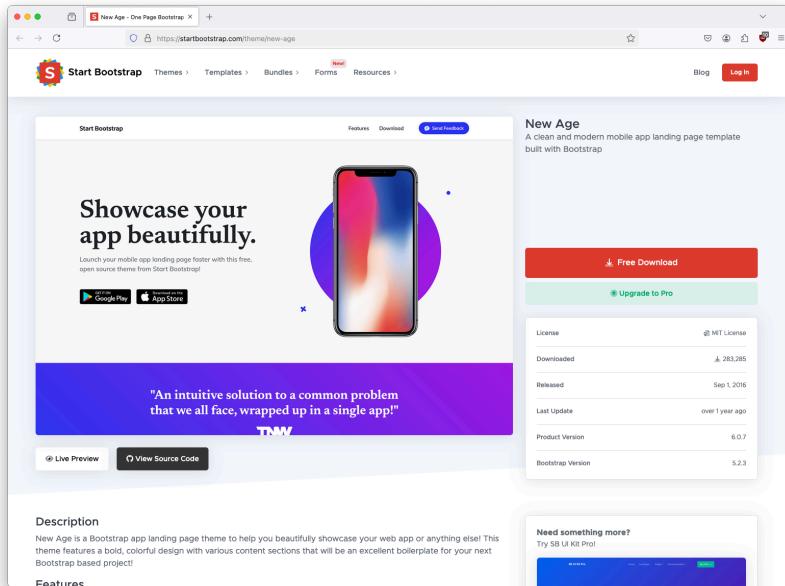
- 1 Then read up on Bootstrap's documentation to enhance the "Create A New Customer" page
 2 using bootstrap form components (<https://getbootstrap.com/docs/5.3/forms/overview/>).
 3 The final version could look something like Figure 8.



4
 5 **Figure 8 – Create A New Customer Page (Left – Small Devices, Right – Larger Devices)**
 6

7 Task 5: Working With Templates

8 While Bootstrap comes with predefined components ready to be used, it is very common that
 9 instead of just using Bootstrap directly, we will use a template that is based on Bootstrap
 10 instead. Templates come with prebuilt pages ready to be modified for different scenarios. For
 11 example, suppose you want to create a landing page for a mobile app, you could find a
 12 template that is geared towards showcasing mobile apps (Figure 9).

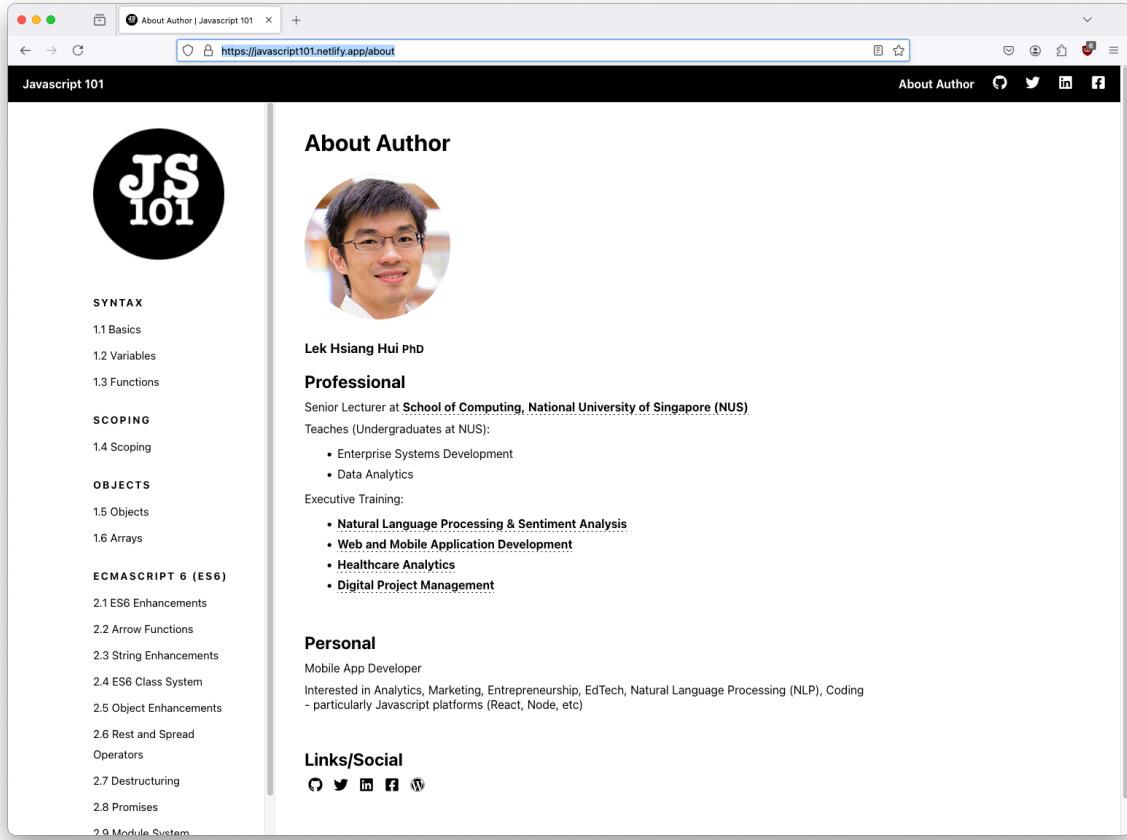


13
 14 **Figure 9 – Example of a free Bootstrap template (<https://startbootstrap.com/theme/new-age>)**
 15

16 We will be adopting a template for our CRM system in subsequent labs but to help you
 17 understand how to work with templates, you will be building your portfolio/user profile
 18 website.

19 Download a free template from the web (e.g. <https://startbootstrap.com/>,
 20 <https://www.templatemonster.com>) and modify it accordingly with your information.
 21 Figure 10 shows an example of how the page might look like. Please ensure that you fill in

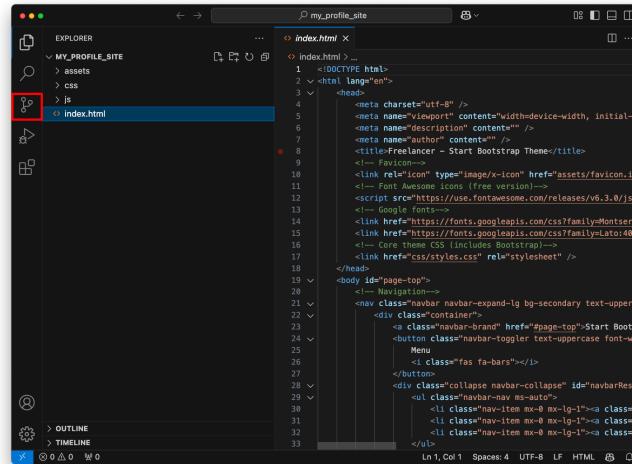
1 the correct data as you will be publishing this site and submitting this site as part of the
 2 homework later.



3
 4 **Figure 10 – Example of an “About Me” website (<https://javascript101.netlify.app/about>)**
 5

6 Task 6: Publishing Your Website Using GitHub Pages

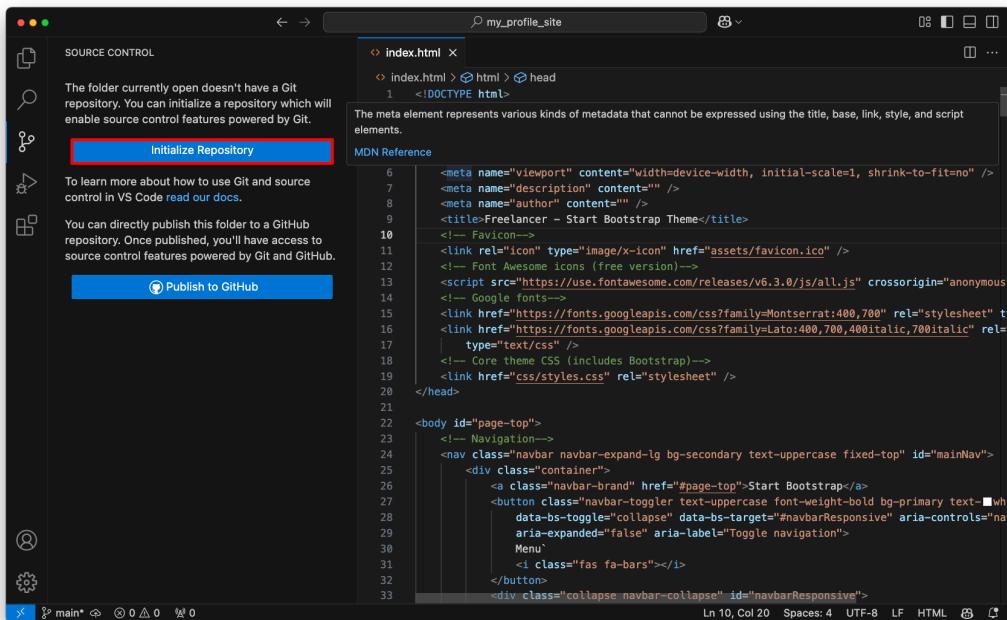
7 For this task, you will learn how to publish your website to the World Wide Web using
 8 GitHub Pages. You would need to have a GitHub account². This section will walk through
 9 how you can do this via VSCode. First, open the project folder on VSCode, and select the
 10 “Source Control” tab on the left sidebar (Figure 11).



11
 12 **Figure 11 – Open the project folder on VSCode and select the Source Control” tab**

² You can sign up for a free GitHub account from <https://github.com/>

- 1 Then select “Initialize Repository” (Figure 12).

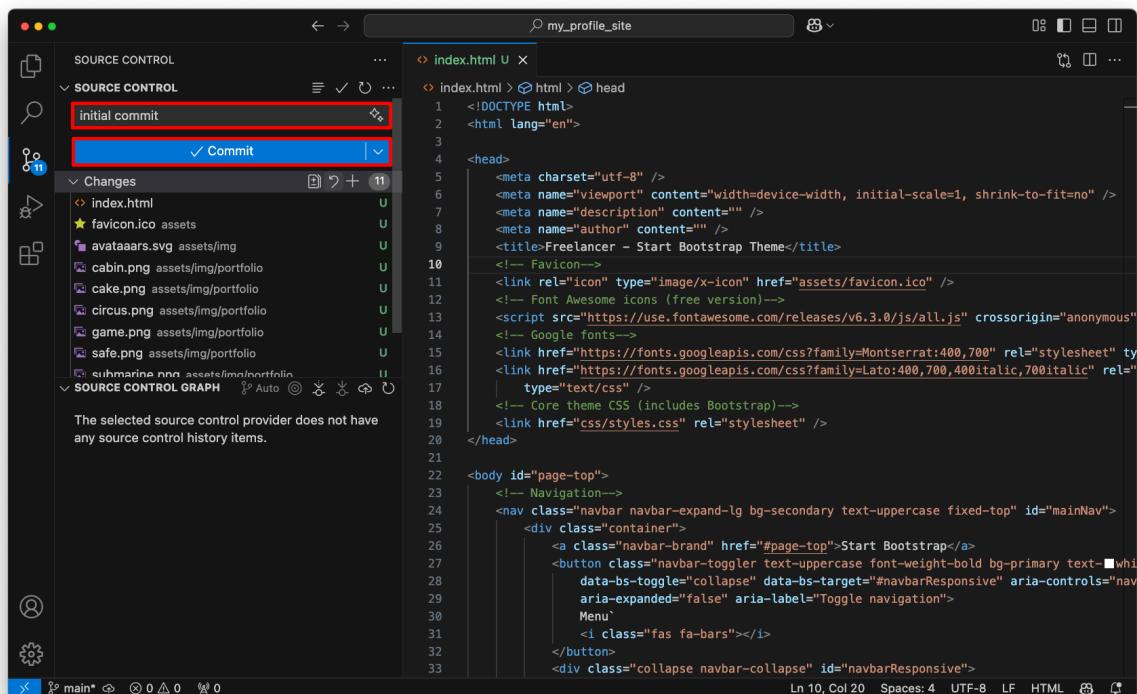


The screenshot shows the VSCode interface with the Source Control tab selected. In the center, there is a code editor window displaying an HTML file named 'index.html'. At the top left of the code editor, there is a red box highlighting the 'Initialize Repository' button. To the left of the code editor, there is a sidebar with various icons and a message: 'The folder currently open doesn't have a Git repository. You can initialize a repository which will enable source control features powered by Git.' Below this message is another button labeled 'Publish to GitHub'.

2
3
4

Figure 12 – VSCode Source Control tab

- 5 Specify a commit message and press the “Commit” button³ (Figure 13).



The screenshot shows the VSCode interface with the Source Control tab selected. In the center, there is a code editor window displaying an HTML file named 'index.html'. In the Source Control sidebar on the left, there is a list of changes. One change is selected and has a red box around it, showing the commit message 'initial commit'. Below the commit message is a red box around the 'Commit' button. The code editor shows the same HTML code as in Figure 12.

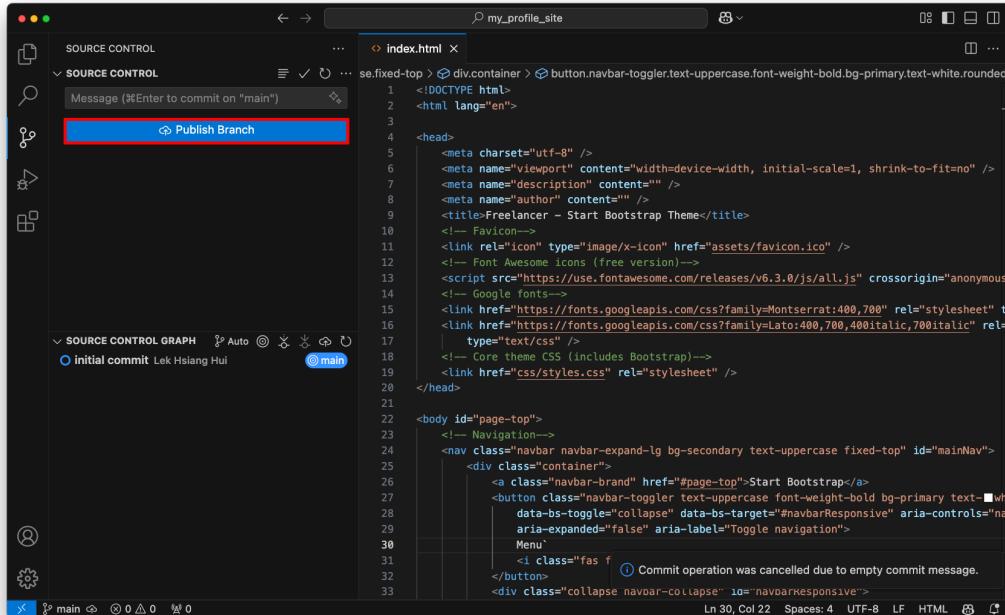
6
7
8

Figure 13 – Commit a version

³ You might also need to set your Github user email and name if you have not configured this earlier. For example, enter the following on your command prompt/terminal:

```
git config --global user.email "ENTER YOUR EMAIL ADDRESS"
git config --global user.name "ENTER YOUR NAME"
```

- 1 Next, select the “Publish Branch” (Figure 14). You will be prompted to sign into your
 2 GitHub account if you have done so earlier.



A screenshot of the Visual Studio Code interface. The title bar says "my_profile_site". The left sidebar has "SOURCE CONTROL" expanded, showing a commit message input field ("Message (%Enter to commit on \"main\")") and a "Publish Branch" button, which is highlighted with a red box. Below it is a "SOURCE CONTROL GRAPH" section showing an "initial commit" by "Lek Hsiang Hui" at branch "@main". The main editor area shows the index.html file's code. The status bar at the bottom shows "Ln 30, Col 22" and other file statistics.

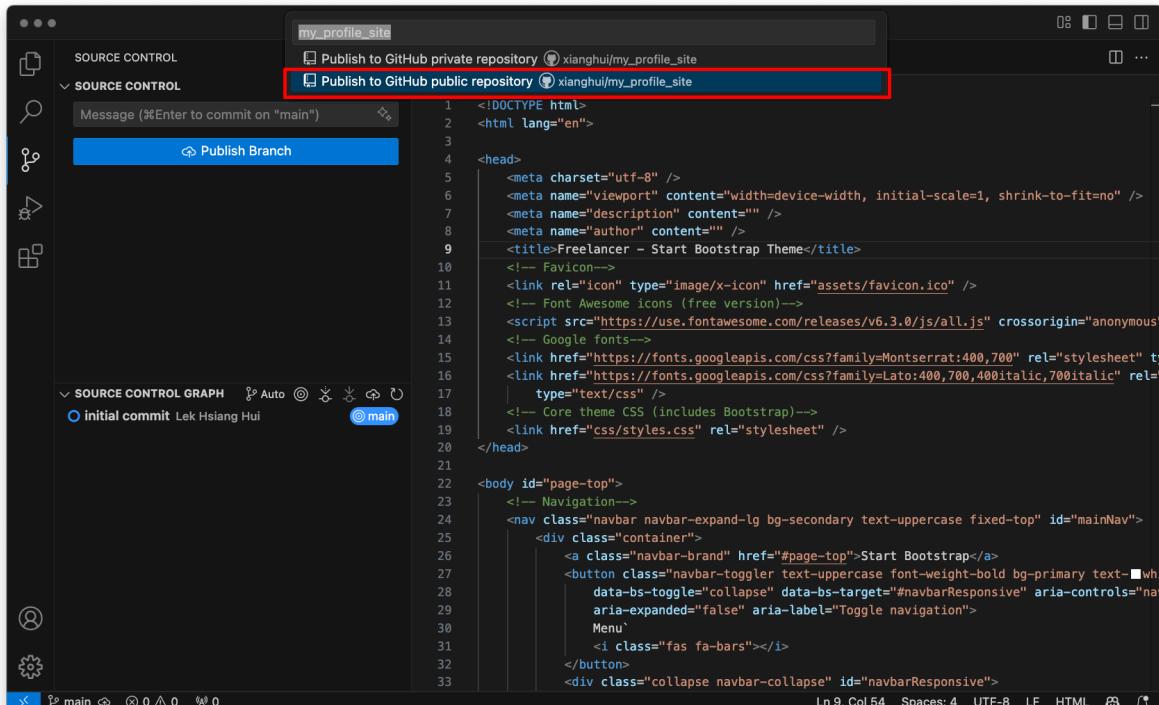
```

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8" />
  <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no" />
  <meta name="description" content="" />
  <meta name="author" content="" />
  <title>Freelancer - Start Bootstrap Theme</title>
  <!-- Favicon-->
  <link rel="icon" type="image/x-icon" href="assets/favicon.ico" />
  <!-- Font Awesome icons (free version)-->
  <script src="https://use.fontawesome.com/releases/v6.3.0/js/all.js" crossorigin="anonymous" />
  <!-- Google fonts-->
  <link href="https://fonts.googleapis.com/css?family=Montserrat:400,700" rel="stylesheet" type="text/css" />
  <link href="https://fonts.googleapis.com/css?family=Lato:400,700,400italic,700italic" rel="stylesheet" type="text/css" />
  <!-- Core theme CSS (includes Bootstrap)-->
  <link href="css/styles.css" rel="stylesheet" />
</head>
<body id="page-top">
  <!-- Navigation-->
  <nav class="navbar navbar-expand-lg bg-secondary text-uppercase fixed-top" id="mainNav">
    <div class="container">
      <a class="navbar-brand" href="#">Start Bootstrap</a>
      <button class="navbar-toggler text-uppercase font-weight-bold bg-primary text-white" data-bs-toggle="collapse" data-bs-target="#navbarResponsive" aria-controls="navBar" aria-expanded="false" aria-label="Toggle navigation">
        Menu
        <i class="fas fa-bars"></i>
      </button>
      <div class="collapse navbar-collapse" id="navbarResponsive">
        <ul class="navbar-nav ms-auto">
          <li class="nav-item active">
            <a class="nav-link text-white" href="#">Home</a>
          </li>
          <li class="nav-item">
            <a class="nav-link text-white" href="#">About</a>
          </li>
          <li class="nav-item">
            <a class="nav-link text-white" href="#">Services</a>
          </li>
          <li class="nav-item">
            <a class="nav-link text-white" href="#">Contact</a>
          </li>
        </ul>
      </div>
    </div>
  </nav>
  <!-- Main Content-->
  <div class="container">
    <div class="row justify-content-center" style="margin-top: 10px;">
      <div class="col-md-6" style="text-align: center;">
        <img alt="Freelancer Start Bootstrap Theme logo" data-bbox="450 100 550 200" style="margin: auto;" />
        <h1 class="font-weight-light" style="font-size: 1.8em; margin-bottom: 0;">Freelancer
        <h2 class="font-weight-light" style="font-size: 1.2em; margin-top: 0;">A Free Bootstrap 4 Theme
        <p style="font-size: 0.9em; margin-top: 0;">This theme is a free download from Start Bootstrap.
        <hr style="margin-top: 10px; border: 0.5px solid #ccc; width: 100%; border-radius: 0.5px; margin-bottom: 10px;"/>
        <div style="border: 1px solid #ccc; padding: 5px; border-radius: 5px; background-color: #f9f9f9; display: inline-block; font-size: 0.9em; font-weight: bold; color: #007bff; text-decoration: none; transition: all 0.3s ease; margin-bottom: 10px; position: relative; z-index: 1;*>
          Get Started
          <span style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: linear-gradient(45deg, transparent 50%, #007bff 50%, transparent 55%, #007bff 55%); z-index: -1;*>
        </div>
        <div style="border: 1px solid #ccc; padding: 5px; border-radius: 5px; background-color: #f9f9f9; display: inline-block; font-size: 0.9em; font-weight: bold; color: #007bff; text-decoration: none; transition: all 0.3s ease; position: relative; z-index: 1;*>
          Download
          <span style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: linear-gradient(45deg, transparent 50%, #007bff 50%, transparent 55%, #007bff 55%); z-index: -1;*>
        </div>
      </div>
    </div>
  </div>
  <!-- Footer-->
  <div style="background-color: #f9f9f9; padding: 10px; text-align: center; font-size: 0.9em; font-weight: bold; color: #007bff; text-decoration: none; transition: all 0.3s ease; position: relative; z-index: 1;*>
    Copyright © 2018 Start Bootstrap
    <span style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: linear-gradient(45deg, transparent 50%, #007bff 50%, transparent 55%, #007bff 55%); z-index: -1;*>
  </div>
</body>

```

Figure 14 – Publish Branch

- 3
 4 You will be prompted to choose either a GitHub private or public repository (both of them
 5 should work) (Figure 15).



A screenshot of the Visual Studio Code interface. The title bar says "my_profile_site". The left sidebar has "SOURCE CONTROL" expanded, showing a commit message input field ("Message (%Enter to commit on \"main\")") and a "Publish Branch" button, which is highlighted with a red box. Below it is a "SOURCE CONTROL GRAPH" section showing an "initial commit" by "Lek Hsiang Hui" at branch "@main". The main editor area shows the index.html file's code. The status bar at the bottom shows "Ln 9, Col 54" and other file statistics. A red box highlights the "Publish to GitHub public repository" option in the dropdown menu.

```

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8" />
  <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no" />
  <meta name="description" content="" />
  <meta name="author" content="" />
  <title>Freelancer - Start Bootstrap Theme</title>
  <!-- Favicon-->
  <link rel="icon" type="image/x-icon" href="assets/favicon.ico" />
  <!-- Font Awesome icons (free version)-->
  <script src="https://use.fontawesome.com/releases/v6.3.0/js/all.js" crossorigin="anonymous" />
  <!-- Google fonts-->
  <link href="https://fonts.googleapis.com/css?family=Montserrat:400,700" rel="stylesheet" type="text/css" />
  <link href="https://fonts.googleapis.com/css?family=Lato:400,700,400italic,700italic" rel="stylesheet" type="text/css" />
  <!-- Core theme CSS (includes Bootstrap)-->
  <link href="css/styles.css" rel="stylesheet" />
</head>
<body id="page-top">
  <!-- Navigation-->
  <nav class="navbar navbar-expand-lg bg-secondary text-uppercase fixed-top" id="mainNav">
    <div class="container">
      <a class="navbar-brand" href="#">Start Bootstrap</a>
      <button class="navbar-toggler text-uppercase font-weight-bold bg-primary text-white" data-bs-toggle="collapse" data-bs-target="#navbarResponsive" aria-controls="navBar" aria-expanded="false" aria-label="Toggle navigation">
        Menu
        <i class="fas fa-bars"></i>
      </button>
      <div class="collapse navbar-collapse" id="navbarResponsive">
        <ul class="navbar-nav ms-auto">
          <li class="nav-item active">
            <a class="nav-link text-white" href="#">Home</a>
          </li>
          <li class="nav-item">
            <a class="nav-link text-white" href="#">About</a>
          </li>
          <li class="nav-item">
            <a class="nav-link text-white" href="#">Services</a>
          </li>
          <li class="nav-item">
            <a class="nav-link text-white" href="#">Contact</a>
          </li>
        </ul>
      </div>
    </div>
  </nav>
  <!-- Main Content-->
  <div class="container">
    <div class="row justify-content-center" style="margin-top: 10px;">
      <div class="col-md-6" style="text-align: center;">
        <img alt="Freelancer Start Bootstrap Theme logo" data-bbox="450 100 550 200" style="margin: auto;" />
        <h1 class="font-weight-light" style="font-size: 1.8em; margin-bottom: 0;">Freelancer
        <h2 class="font-weight-light" style="font-size: 1.2em; margin-top: 0;">A Free Bootstrap 4 Theme
        <p style="font-size: 0.9em; margin-top: 0;">This theme is a free download from Start Bootstrap.
        <hr style="margin-top: 10px; border: 0.5px solid #ccc; width: 100%; border-radius: 0.5px; margin-bottom: 10px;"/>
        <div style="border: 1px solid #ccc; padding: 5px; border-radius: 5px; background-color: #f9f9f9; display: inline-block; font-size: 0.9em; font-weight: bold; color: #007bff; text-decoration: none; transition: all 0.3s ease; margin-bottom: 10px; position: relative; z-index: 1;*>
          Get Started
          <span style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: linear-gradient(45deg, transparent 50%, #007bff 50%, transparent 55%, #007bff 55%); z-index: -1;*>
        </div>
        <div style="border: 1px solid #ccc; padding: 5px; border-radius: 5px; background-color: #f9f9f9; display: inline-block; font-size: 0.9em; font-weight: bold; color: #007bff; text-decoration: none; transition: all 0.3s ease; position: relative; z-index: 1;*>
          Download
          <span style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: linear-gradient(45deg, transparent 50%, #007bff 50%, transparent 55%, #007bff 55%); z-index: -1;*>
        </div>
      </div>
    </div>
  </div>
  <!-- Footer-->
  <div style="background-color: #f9f9f9; padding: 10px; text-align: center; font-size: 0.9em; font-weight: bold; color: #007bff; text-decoration: none; transition: all 0.3s ease; position: relative; z-index: 1;*>
    Copyright © 2018 Start Bootstrap
    <span style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: linear-gradient(45deg, transparent 50%, #007bff 50%, transparent 55%, #007bff 55%); z-index: -1;*>
  </div>
</body>

```

Figure 15 – Publish to a GitHub repository

- 8
 9 The files should then be uploaded to GitHub and accessible via the repository name (e.g.
 10 https://github.com/xianghui/my_profile_site). Go to the repository main page (Figure 16)
 11 and access the “Settings” page.

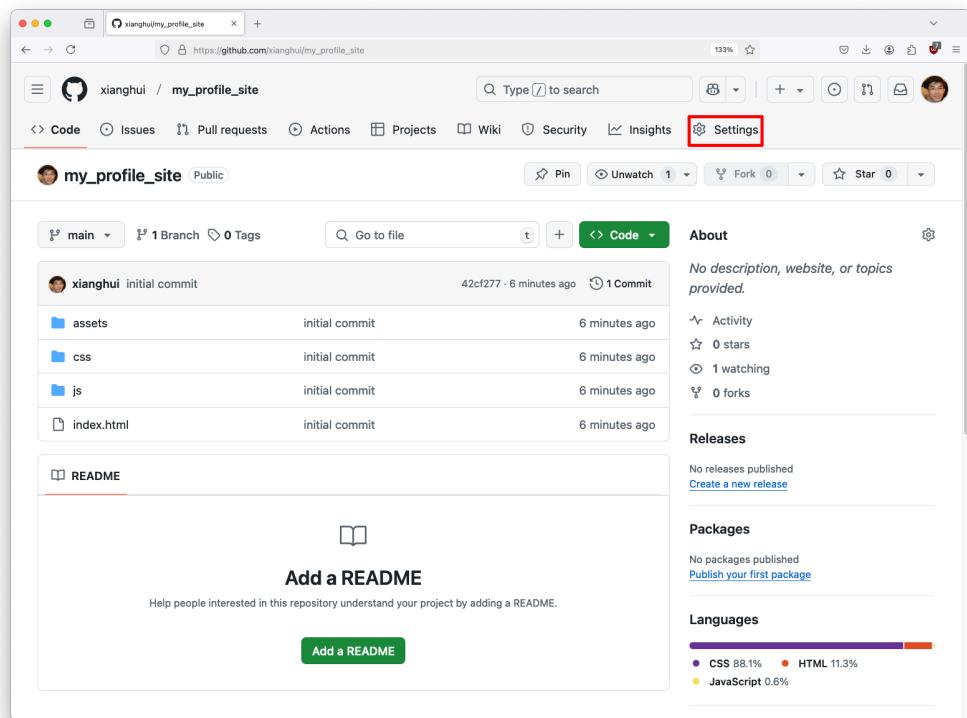
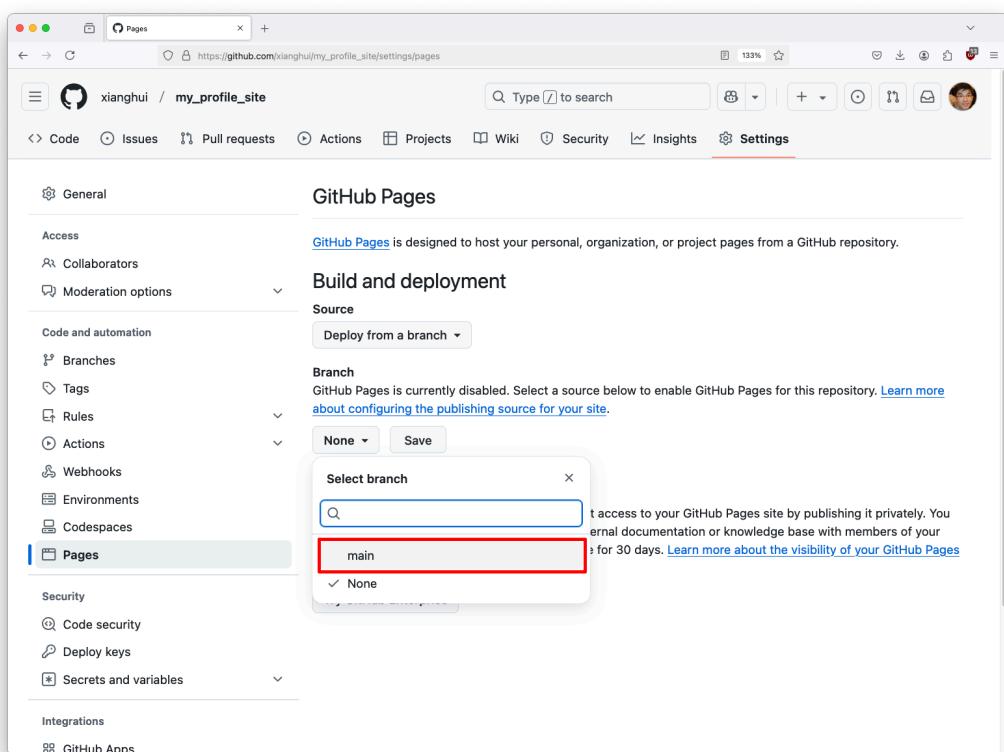
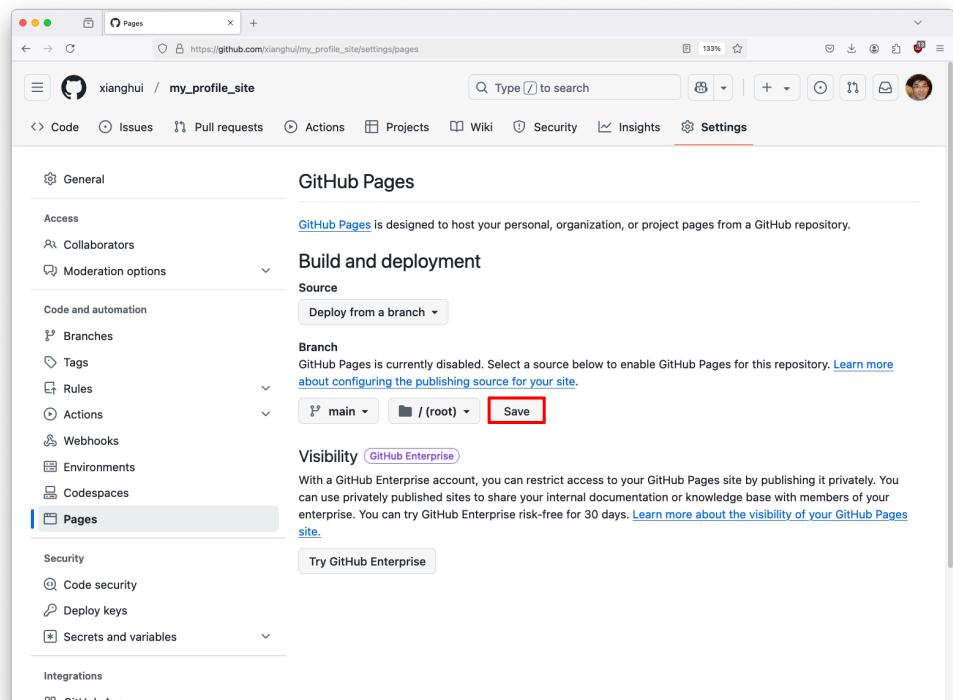
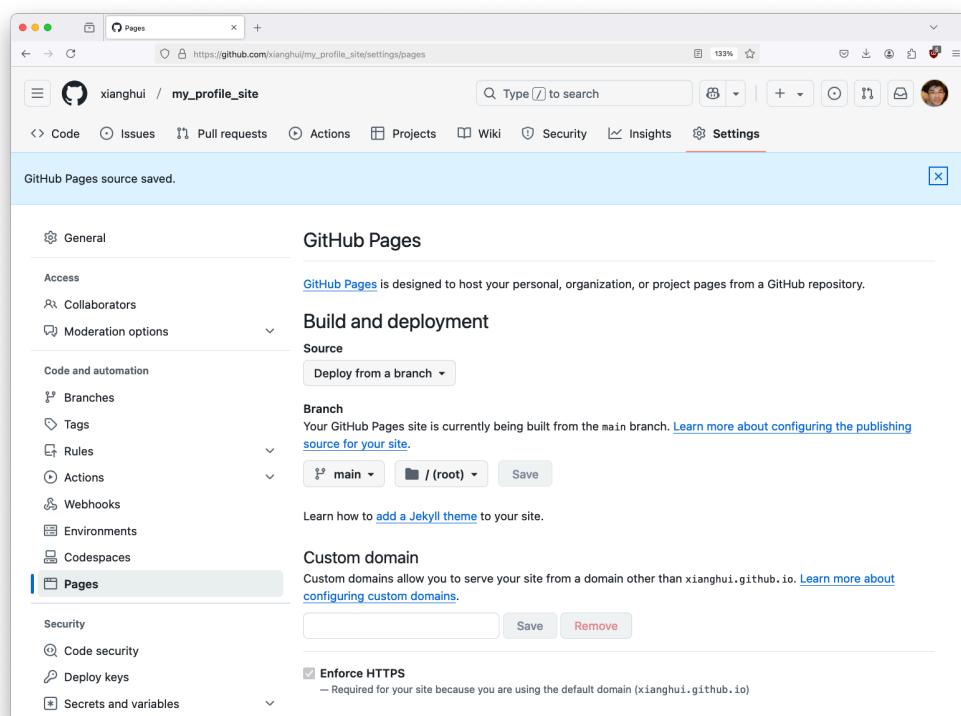


Figure 16 – Repository main page

- 1
2 Then on the GitHub Pages screen, select the “main” branch and select “Save” (Figure 17). It
3 should then show the message “GitHub Pages sources saved” (Figure 18).
4
5



6

1
2**Figure 17 – GitHub Pages screen**3
4
5
6
7
8
9
10**Figure 18 – GitHub Pages source saved.**

Wait a few minutes, your page should now be available at https://YOUR_GITHUB_NAME.github.io/REPOSITORY_NAME/. For example, the location of the site will be https://xianghui.github.io/my_profile_site/ for this example.

END OF LAB 1