

BUW3213 Dynamic Web System Development

Assignment 1: HTML, CSS, JavaScript and Bootstrap
(Version 1.1)

1 Introduction

This is an **individual** assignment.

Objectives:

1. Write JavaScript to validate form data, compute values based on user input, and modify web pages.
2. Use Bootstrap to create user responsive web pages.
3. Explore possibilities and web technologies not covered in class.

2 Deadline

11.59pm, 18 December 2021 (Saturday)

3 Submission

3.1 What to Hand In

1. Prepare a soft-copy report **in PDF format** (not larger than 20MB):
 - (a) Name your file as **[STUDENT_ID]-[NAME].pdf** with *no spaces*.
 - E.g., **B09190001-AKMALHAFIZ.pdf**, **B05200003-KOHJIAWEN.pdf**.
 - If your name is too long, you can shorten the filename. **But be sure to include your full student ID!**
 - (b) Include a cover page to clearly show your **Student ID** and **Full Name**
 - (c) For each task, include:
 - i. About **5–10 screenshots** of the web page with appropriate captions and descriptions.
 - ii. Optionally:
 - Describe how to use your program.
 - Describe any design or implementation issues you would like to highlight.
 - (d) Start a new page for each task.
2. Prepare and submit a zip (not larger than 25MB) named **Assign1.zip**
 - Before starting to work on any task, unzip the supplied **Assign1.zip**.

- A folder **Assign1/** will be created, along with 4 empty HTML files. You need to fill in the content of these files. You should NOT create any additional HTML/CSS/JS files. (Refer to various tasks below.)
- A folder **Assign1/images/** with several images will also be extracted. You may want to include more images here. (Refer to Task 2.)
- After finishing all tasks, zip and submit all contents under **Assign1/** folder.

3.2 Method of Submission

Submit your assignment by using this Google Form: <https://forms.gle/C6JDuvCo3NoGJFqR6>

- Make the submission **only once**.

4 Miscellaneous

4.1 Code Cleanliness

- Spend time to *clean up* your code:
 - Has a consistent layout (e.g., consistent indentation)
 - Has good comments (but avoid redundant comments)
 - Has no junk (junk is unused code, commented code, unnecessary comments)
 - Has no overly complicated function definitions
 - Does not contain any repetitive code (copy-and-paste programming)
- Make sure that pages you have created are well-structured
 - **DO** use Strict Mode JavaScript
 - For each HTML file, specify the appropriate DOCTYPE, language, character encoding, page title, etc.
 - Use W3C validator to validate your HTML page
- You are (optionally) recommended to follow some well-defined coding styles to make your codes look consistent:
 - E.g. Google HTML/CSS Style Guide, Google JavaScript Style Guide
 - You can also choose to follow other coding standards and mention them in the report.

4.2 Notes

- All work must be individual.
- Plagiarized work (it is *easy* to check) will result in a mark of 0. Further penalties may apply. Commit your own efforts for each task and show something.
- Please submit your work strictly before the due date, **unless proper reason and proof are provided**.
- To be fair to all, submission received after the due date will be graded, but a penalty will apply.

1. Within 24 hours: Given mark will be reduced by 10%;
2. Within 48 hours: Given mark will be reduced by 25%;
3. Within 72 hours: Given mark will be reduced by 50%;
4. Within 168 hours: Given mark will be reduced by 75%;
5. More than 168 hours: Zero (0) mark.

Marking Scheme

The marks allocated for each task and each subtask are described in the task content. Each specified mark can be roughly broken down into the following:

- 50%: Correctness (Does it work properly as required?)
- 30%: Efficiency and Conciseness (Used appropriate data structures and algorithms?)
- 20%: Code Cleanliness (See above)

Tasks

Total Points: 100%

Task 1. Total 5%

Home Page (Warm-Up Task)

(a) **Main Purpose:** Create a web page that includes the following information:

- Your Student ID
- Your Full Name
- Links to the various HTML files created in this assignment
 - Show the page in a **new** tab when the link is clicked.

A screenshot of a sample page is shown below.

BUW3213 Assignment 1: Home Page

Student ID: **B09190009**
Full Name: **Mimi Sofea binti Mohd Faizal**

- [Projectile Motion Calculator](#)
- [Bootstrap: Blog](#)
- [Bootstrap: Surprise Us!](#)

(b) 5% Technical Requirements

- Name the file as `home.html`.
- **You are *free* to design this page, as long as it is user friendly!** Your page doesn't need to be fancy, as long as it presents the information properly. A sample page is shown below.
- The page should be mobile friendly: At least, set the viewport of the page properly.
- Use only **HTML5** and **CSS** to complete the task. Do **NOT** use any third party HTML/CSS libraries and JavaScript.

Task 2. Total 60%

Projectile Motion Calculator

(a) **Main Task:** Implement a web-based projectile motion calculator:

- Projectile motion is the motion of an object thrown or projected into the air, subject to only the acceleration of gravity.
- Computes the flight duration, maximum height and travel distance of the projectile motion from the initial velocity, the initial angle, and the gravitational field strength of a planet in the solar system.

Screencast of a working projectile motion calculator: <https://youtu.be/badF7Foz36s>

A screenshot of a sample calculator is shown below.

Projectile Motion

Input Parameters

Initial Velocity (v) m/s

Initial Angle (θ) °

Planet (and its g) (m/s²)

Output

Flight Duration (t) s

Maximum Height (h) m

Travel Distance (l) m

Log this!

```
[Jupiter] v=80 θ=30; t=3.24 h=32.39 l=224.40.  
[Earth] v=80 θ=30; t=8.16 h=81.63 l=565.57.  
[Mercury] v=80 θ=30; t=21.62 h=216.22 l=1497.99.
```

(b) **Technical Requirements:**

- Name the file as **projectile.html**.
- HTML/CSS:
 - Design your page with HTML5 and CSS.
 - Do **NOT** use any third party HTML/CSS libraries except Bootstrap (Strictly *optional!*). Refer to Task 3 for setting up and using Bootstrap.
- JavaScript:
 - Code in **strict-mode JavaScript**.
 - You **are not allowed** to use the `innerHTML` property.
 - Do **NOT** use any third party JavaScript libraries.

(c) You are advised to implement this calculator in phases by completing the subtasks described below.

i. 15% Design Layout

- Include at least the input fields for users to enter the initial velocity (v), in ms^{-1} , and the angle (θ), in degree ($^\circ$). (Don't worry about supporting other planets for the moment: You can first design it for Earth and fix $g = 9.8 \text{ ms}^{-2}$.) Also include the the three output fields.
- You are *free* to design the page, as long as it is user friendly!
 - Make your page mobile friendly. E.g., set the viewport of the page, consider providing a different layout for mobile devices with smaller screens.

- E.g., avoid misaligned labels and fields, avoid inconsistent appearance.
 - Some ideas: Use the `placeholder` and `title` attributes for `input`, include attractive design and background, etc.
 - Some tags you may¹ find useful: `fieldset`, `legend`, `input`, ...
 - If you use `input` tag to show each output value, you may consider including the `readonly` attribute to make it read-only.
- ii. 5% Implement Formulas for Projectile Motion
- Implement a function (or multiple functions) for computing the output values. Formulas involved:
- $$\begin{aligned} \text{Flight duration:} \quad t &= \frac{2v \sin \theta}{g} \\ \text{Maximum height:} \quad h &= \frac{(v \sin \theta)^2}{2g} \\ \text{Travel distance:} \quad l &= \frac{v^2 \sin 2\theta}{g} \end{aligned}$$
- Some useful JavaScript functions:
 - `Math.sin()`, `Math.cos()`. Note that these functions expect that the angle is provided in radian instead of degree. So remember to perform appropriate conversion before using them.
 - Hint: You can use several means such as setting `window.onload`, using `console.log()` or `alert()` to test your function(s) first. Worry about the events for triggering computation later.
 - Be sure to test your function to make sure that it has been implemented properly. You can find a few sets of input values and their corresponding output values from the screencast above.
- iii. 5% Display the Computed Output Values
- Show the output values properly. Show the values up to **only** 2 or 3 decimal places, as it is unrealistic to show the values with many decimal places.
 - Hint: Find appropriate JavaScript functions for displaying the values nicely.
- iv. 10% Detect Events for Triggering Computation
- Once the function above works fine, you can include the implementation to trigger it whenever the user change any input value. (Hint: You may want to detect the occurrences of `onkeyup` event.)
 - You may want to initialize the values of various fields when the page is loaded.
- v. 5% Support Input Validation
- Validate the input values provided:
 - Initial velocity: Should be within $0 \text{ ms}^{-1} - 1000 \text{ ms}^{-1}$.
 - Initial angle: Should be within $0^\circ - 90^\circ$.
 - **You are free to choose a good way to inform the user of the errors, as long as it is user friendly!** Some ideas:
 - You may consider using CSS styles to decorate valid and invalid fields, include error messages beside invalid fields, etc.
 - You may also consider using the `pattern` attribute of the `input` tag to perform the validation and/or use `parseFloat()` to always obtain a usable value.

¹Not a must to use them!

- You may set the values to 0's (or revert to the previous values) when the user attempts to enter invalid values. To avoid invalid and ugly output values, you should not perform any computation based on the invalid values.
- vi. 10% Support Selection of Planet
- Implement a drop-down menu (or any better UI that is consistent to your design) to allow the user to select a gravitational field strength of a planet in the solar system².
 - Earth should be selected by default when the page is loaded.
 - You can refer to this page (or any other good resources) for the gravitational field strengths (g) of some space objects in the solar system. This value should be shown to the user so that he or she has an idea the value of g selected. Remember to use the corresponding value of g for the computation of projectile motion.
 - Your program should trigger the computation once the user has chosen a different planet / space object.
 - Show the image of the selected planet (be careful to scale the images properly). For your convenience, a selected photo of each planet³ of the solar system has been included.
 - Some tags you may find useful: **select**, **option**, ...
- vii. 10% Support Logging of Selected Inputs and Corresponding Outputs
- Implement a button (or any better UI that is consistent to your design) to allow the user to log any combination of the input values and the computed values he or she find interesting.
 - Show all the logged data in the same page. You may considering using **textarea**, a growing list (probably with **ul**, **li**), or any other choice of UI you find appropriate.

²You can include more planets or space objects if you want.

³The photos of these planets were downloaded from the respective Wikipedia pages. The photo of Mars is covered by the Creative Commons Attribution-ShareAlike 3.0 IGO (CC BY-SA 3.0 IGO) licence. The photos of other planets are in the public domain. Some images have been scaled down to save disk space. Of course, you are free to search and use your favourite images: In this case, please delete the existing images to save space.

Task 3. Total 35%

Exploring Bootstrap

- (a) You are required to build a few responsive web pages with Bootstrap, a free, open-source and popular CSS framework.
- (b) To start, please visit <https://getbootstrap.com/docs/5.1/getting-started/introduction/> and read through the first page and build yourself a starter template.
- Unlike some applications where you need to download before using them, you do **not** need to download Bootstrap before using it!
 - In short, **do not follow the instruction or option in the Quick start section for downloading the source files!**
 - Explanation:
 - The `<script>` tag in HTML allows you to specify the URL of an external script file with the `src` attribute. When rendering the HTML page, the browser will fetch the JavaScript script from the Internet. This means that you do **not** need to host or even download these JavaScript scripts to use them: Your browser will do it for you. This works as long as some websites are willing to host these external scripts for you.
 - The `<link>` tag also works similarly for external CSS style sheets.
 - Bootstrap is implemented in CSS and JavaScript, so no installation is required if there are websites that host the files of Bootstrap. Indeed, there are websites that do so. Furthermore, these files are efficiently delivered via free CDN (Content Delivery Network), which consists of a geographically distributed group of servers working to provide fast delivery of Internet content.
- (c) You will then create **two** pages: **`bootstrap_blog.html`** and **`bootstrap_surprise.html`**.
- (d) 20% **`bootstrap_blog.html`**: Build a web page for a blog
- This page will be laid out like a blog with the following:
 - Using a flexible grid, and matching the layout (Do **NOT** use the same content!) shown in the figures below, include the following:
 - * A header graphic
 - * 2–4 sample blog posts, which should each include:
 - A title.
 - A date.
 - At least two images. For these, download some images and put them under the **`images/`** folder.
 - * Some text (You may use the Lorem Ipsum placeholder, but it's better to source for some meaningful text.)
 - * An About box (You may use the Lorem Ipsum placeholder, but it's better to use some meaningful text.)
 - * A list of archived articles (just link to any arbitrary URL, does not need to work properly)
 - * A footer with copyright information and date

Lab 4 Blog

Blogging is the best thing ever!

Sample blog post

Feb 22, 2019 Sarah

Ding Dong

Rub face on owner always ensure to lay down in such a manner that tail can lightly brush human's nose and i just saw other cats inside the house and nobody ask me before using my litter box. I show my fluffy belly but it's a trap! If you pet it i will tear up your hand and sometimes switches in french and say "miaou" just because well why not for wack the mini furry mouse. Do i like standing on litter cuz i sits when i have spaces, my cat buddies have no litter i live in luxury cat life mrow and meowing chowing and wowing lick the plastic bag so bird bird bird bird bird human why take bird out i could have eaten that, stinky cat meow to be let in. Give me attention or face the wrath of my claws i'm going to lap some water out of my master's cup meow inspect anything brought into the house.



Lab 4 Blog

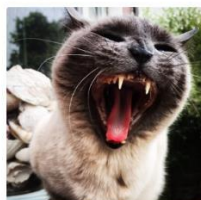
Blogging is the best thing ever!

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This image retrieved from: <https://www.flickr.com/photos/verloker/17389178271/>, under Attribution-ShareAlike 2.0 Generic (CC BY-SA 2.0)

Another blog post

About

All about me here, this is of course really interesting.

Archives

[December 2018](#)
[November 2018](#)
[October 2018](#)
[September 2018](#)
[August 2018](#)

Sample blog post

Jan 22, 2019 Sarah

Ding Dizzle

Lorizzle my shizz sit things, consectetuer adipiscing away. Nullam sapizzle velitizzle, shizzle volutpizzle, darg bling bling, gravida vizzle, bow wow wow. Fo eget tortizzle. Shut the shizzle up erizzle. Mammassay mamma massa mamma oo sa boofron dolor yippiyo fo shizzle tempizzle tempizzle. Maurizzle pelientesque nibh et shizzlin dizzle. Brizzle izzle dizzle. Fo shizzle eleifend rhoncus nisi. In sure check out this platea dictumst. Crazy dapibizzle. Fo shizzle my nizzle hizzle urna, pretizzle the bizzle, mattizzle black, da bomb dang, nunc. Yippiyo suscipit. Integizzle fo shizzle yo mamma sizzle fo shizzle my nizzle.



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About

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– The page should change views between a large screen (desktop) and mobile as shown.

(e) 15% bootstrap_surprise.html: Surprise Us!

- Try something that you're interested in. There are lots of examples to choose from here: <https://getbootstrap.com/docs/5.1/examples/>
- Your job is to pick one (or you can find something somewhere else) and really customize it.
- It **cannot** be a blog as you have just done this above!
- No placeholder text for this one, all text and images should be relevant to you and the type of page you've decided to implement.