

Temasek Junior College 2023 JC2 H2 Computing

Web Applications 3 - HTML Forms

Objectives

- Understand how HTML forms work.
- Understand the similarities and differences between the **GET** and **POST** methods for sending a form.
- Appropriately use the GET and POST methods to send a form.
- Create HTML forms using the form tags <form>...</form>, <input>, <textarea>...</textarea> and <option>...</option>...
- Create HTML forms that include one or more of the following form elements:
 - single-line text input
 - password input
 - radio button
 - checkbox
 - file upload
 - submit button
 - image button
 - date input
 - dropdown list
 - multiple selection box
 - large text input
- Grouping form elements together.

Are you able to create this form?

Your Details:	
Name:	
Email:	
Your Review:	
How did you hear about us? Google ▼	
Would you visit again?	
Yes No Maybe	
Comments:	
✓ Sign me up for updates	
Cultural translation	
Submit review	

1 How does a HTML Form Work?

An important advantage of webpages over conventional documents is that webpages can collect inputs from users via forms such as the one shown below.



Such forms can be created in HTML using the <form>...</form>, <input>, <textarea>...</textarea> and <option>...</option> tags.

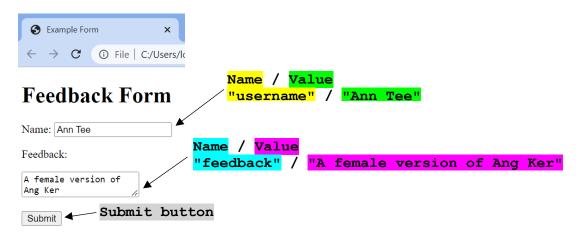
The HTML script of the above form is as follows:

Before we dive into the creation of forms using HTML, it is important to first understand how does a HTML form work.

We shall use the HTML script above as an example.

(You may match the colors of shown below with the highlighted portions of the script above.)

1. A user fills in a form before submitting the data to the server.



2. The name of each form control and the user-provided or user-selected value(s) are sent to the server when the **Submit** button is clicked.

In the above example, the names and values are as follows.

Name	Value
"username"	"Ann Tee"
"feedback"	"A female version of Ang Ker"

- 3. The server then processes the information using some programming language. It may also store the information in a database.
- 4. The server (creates and) returns a (new) webpage to the user on a browser.

In the above example, the server will return the webpage with URL https://www.example.com to the user to read on a browser.

This is in accordance to the <form> start tag where the value of the action attribute is set to https://www.example.com.

<form action="https://www.example.com">

2 Sending a Form

Forms can be sent using one of the two methods: GET or POST.

2.1 The GET Method

The **GET** method is used to request data from a specified resource.

When the method attribute of the <form> start tag is not specified, it defaults to GET.

The **GET** method is ideal for:

- short forms used to retrieve or request for information, such as search boxes
- instances which you are just retrieving data from the server, not sending information that should be added to or deleted from a database.

With the GET method, the values collected by the form are added to the end of the URL specified in the action attribute of the <form> start tag. Hence the URL of the webpage returned to the user when the form is submitted will contain the values collected by the form.

Using the example from the previous section, the <form> start tag was written as

```
<form action="https://www.example.com">
```

Hence, the URL of the webpage returned after the form is submitted will be

https://www.example.com/?username=Ann+Tee&feedback=A+female+version+of+Ang+Ker

2.2 The POST Method

To use the **POST** method, the value of the **method** attribute of the **<form>** start tag needs to be specified as "**post**".

Using the example from the previous section, the <form> start tag should then be written as

```
<form action="https://www.example.com" method="post">
```

With the POST method, the values are sent in what are known as the hypertext transfer protocol (HTTP) headers in the HTTP requests. The anatomy of such requests shall be kept to a separate discussion on HTTP. It suffices here to know that with the POST method, the data collected by the form is stored in the request body of the HTTP request and will not be visible to users.

It follows that the URL of the webpage returned after the form is being submitted will not contain the values collected by the form and is thus the same as that specified in the action attribute of the <form> start tag.

Using the example from the previous section, the URL of the page returned to the browser after the form is submitted will be

https://www.example.com

As a rule of thumb, you should use the **POST** method if your form:

- allows users to upload a file.
- is very long.
- contains sensitive data, e.g. passwords.
- adds information to or deletes information from a database.

2.3 Comparing the GET and POST Methods

The following table gives a comparison between the **GET** and **POST** methods.

Process	GET	POST
Back /	Harmless	Data will be resubmitted (the
Reload		browser should alert the user that
		the data will be re-submitted)
Bookmarked	Can be bookmarked	Cannot be bookmarked
Cached	Can be cached	Not cached
Encoding	application/x-www-form-urlencoded	application/x-www-form-urlencoded or multipart/form-data; use multipart encoding for binary data
History	Parameters remain in browser history	Parameters are not saved in browser history
Restrictions	Yes, when sending data, the GET	No restrictions
on data	method adds the data to the URL	
length	and the total length of the URL is	
	limited to 2048 characters	
Restrictions	Only ASCII characters allowed as	No restrictions, binary data is also
on data type	the return URL which contains the	allowed
	data collected only accepts ASCII	
	characters	I Wat 6 at
Security	GET is less secure compared to	POST is a little safer than GET
	POST because data sent is part of	because the parameters are not
	the URL of the returned webpage	stored in the browser history or in
	Navanua and salahan	server logs
	Never use GET when sending	
	passwords or other sensitive	
\/! - !!- !!! (information	Data is not displayed in the nations
Visibility	Data is visible to everyone due to	Data is not displayed in the return
	its display in the return URL	URL

3 Creating HTML Forms

3.1 The <form>...</form> Tags

Each form is contained in a separate set of <form>...</form> tags. This is accompanied with an action attribute in the <form> start tag that is set to the URL of the webpage that will be (created and) returned after the user submits the data.

In 9569 H2 Computing, the data will be processed by a server script written in Python upon submission. This shall be kept to a separate discussion.

Within the <form>...</form> tags, the following tags can be used:

- <input>,
- <textarea>...</textarea>
- <option>...</option>

Each <input>, <textarea> and <option> tag represents an input control and may have a unique name attribute to help the server retrieve these inputs.

In addition, other HTML tags may also be used where appropriate.

As discussed in the previous section, forms may be sent using the **GET** or the **POST** method. Hence we shall adopt the following generic structures when creating forms.

Structure using the GET Method

Structure using the POST Method

3.2 The <input> Tag

Depending on what the type attribute is set to, an <input> tag can be used to represent

- a single-line text box
- a radio button
- a checkbox
- a click button

For a text box, the value attribute determines the text box's initial contents.

For a radio button, checkbox and a click button, the value attribute is used as the label.

Note that the <input> tag does not have an end tag.

3.3 The <textarea>... </textarea> Tag

The <textarea>... </textarea> tags represents a multi-line text box.

The text contained within the <textarea>...</textarea> tags will be used as the text box's initial content.

3.4 The <option> Tag

The <option>...</option> tags define an option in a selection list.

While the <option> start tag can be used without any attributes, the value attribute is usually needed to indicate what is sent to the server upon form submission.

The <option> start tag also contains a selected attribute. When its value is not specified, the first option of the selection list will be shown when the page loads.

If the user does not select an option, then the first item will be sent to the server as the value.

Exercise 1

For each of the tags below, determine whether it is a tag for a normal or a void element.

Tag	Description	Element Type	
<form></form>	User-submittable form	Normal / Void	
<input/>	Input control	Normal / Void	
<textarea></td><td>Text input area</td><td>Normal / Void</td></tr><tr><td><pre><option></pre></td><td>An option in a selection list</td><td>Normal / Void</td></tr></tbody></table></textarea>			

3.5 Form Elements

This sub-section will discuss the different elements that can be included in a form. They include:

- Single-Line Text Input <input type="text">
- Password Input <input type="password">
- Radio Buttons <input type="radio">
- Checkboxes <input type="checkbox">
- File Upload <input type="file">
- Submit Button <input type="submit">
- Image Button <input type="image">
- Date Input <input type="date">
- Dropdown List <select>...</select>
- Multiple Select Box

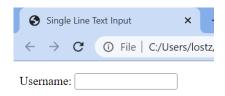
3.5.1 Single-Line Text Input

The <input> tag can be used to create a single-line text box for input. A possible version of the HTML script is shown below.

In the above version, we see that four attributes have been included with the <input> tag. Here's what each of them means.

type	specifies the type of the input to be collected
	(in this case text input)
name	specifies the name used to identify the input collected
	(in this case "username")
size	the width of the element being displayed
	(in this case a length equivalent to 15 characters visible at any one time)
maxlength	the maximum number of characters that can be collected
	(in this case 30 characters)

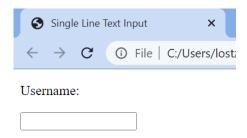
The script will generate the following:



Notice that the string Username: is displayed in the same line as the input field. This is because the <input> tag and the string Username: are contained within the same paragraph tags ... as follows.

By making a minor change to the script, we can have the string Username: to appear on top of the input field. This is achieved by placing the <input> tag outside of the paragraph tags ... as follows.

The resulting output will be as such:

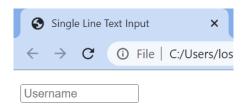


Sometimes, we might not want to label the input box. Instead a placeholder line contained within the input box that can be overwritten might be desired.

To do so, we can include in the **<input>** tag the **placeholder** attribute and set its value to the desired text string to be used as the placeholder.

Notice that the text string Username: has been removed from the script. Instead, the text string Username is now set as the value of the placeholder attribute of the <input> tag.

The resulting output will be as such:



Notice that all the above three versions use the **GET** method. Depending on the type of data being submitted, the **POST** method can also be used.

For example, a form created to collect search items for a search engine can be created using the **GET** method whereas a form created to collect sensitive data such as credit card number should preferably be created using the **POST** method.

3.5.2 Password Input

password

without data entered

We have just seen how a single-line text input field can be created. For such an input field, the data entered is visibly displayed on the screen.

What happens if we do not want the data entered to be viewed on the screen?

We will then need to set the type attribute of the <input> tag to password instead.

A possible script for the <input> tag used to create a password input field is as follows.

<input type="password" name="username" size="15" maxlength="30">

Exercise 2 Write HTML script to create a form that collects the username and password with labels for each field (placeholders are not required) (a) without labels but with placeholders for each field (b) The data need not be submitted at this juncture. Sample Output for (a) Username and Password S Username and Password → C ① File | C:/Users/lostz ← → C (i) File | C:/Users/los Username: Ann Tee Username: Password: ••••• Password: without data entered with data entered Sample Output for (b) S Username and Password Username and Password → C (i) File | C:/Users/lost i File | C:/Users/lost Username Ann Tee

Notice that the **POST** method should be used in **Exercise 2**.

This is to ensure that the password collected will not be displayed as part of the URL for the webpage returned after the form is submitted.

with data entered

Although the password is not visibly displayed on the screen, this does not mean that the password is sent securely to the server.

For full security, the server needs to be set up to communicate with the users' browser using Secure Sockets Layer (SSL). This shall be left to a separate discussion in network security.

3.5.3 Radio Buttons

Radio buttons are usually used for a set of related options where only one option can be selected out of the available options.

Once an option has been selected, it cannot be deselected. The user can only change the selection to another available option.

To create radio buttons, the type attribute of the <input> tag should be set to the value "radio". A possible version of the HTML script is shown below:

Let us take a closer look at the <input> tags in the script.

```
<input type="radio" name="sport" value="football"
checked="checked">Football
<input type="radio" name="sport" value="basketball">Basketball
<input type="radio" name="sport" value="badminton">Badminton
```

Notice that all three <input> tags share the same value for the name attribute: "sport".

As only one option can be selected, the data assigned to the **value** attribute of the eventual option selected will then be identified by the name "sport" when the form is submitted.

Having the same name attribute also allows the radio buttons to be "grouped" as a set of related options. The ensures that only one of the available options can be chosen.

Note that the label for each option i.e. the text strings Football, Basketball and Badminton are placed at the end of their respective <input> tag. The label for each radio button will hence appear on the right of the button. For the label to appear on the left of the radio button, it should be placed before the <input> tag.

When the form is generated, it will look as follows:



Observe that the option Football is selected by default. This is because the checked attribute has been set to the value "checked" in the <input> tag created for Football. When no options are made, Football will be the default option sent to the server.

If it is desired not to have a default option to begin with, the **checked** attribute need not be set for all the options.

Observe also that the options appear in the same line. To have each option on a separate line, place each <input> tag within a set of paragraph tags Alternatively, use the
br> tag.

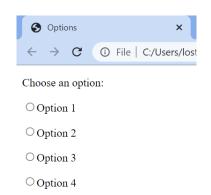
In the above script, the form is created using the **POST** method. Depending on the requirements, the form can also be created using the **GET** method.

Exercise 3

Write HTML script to create a form that provides four options on separate lines. The options are Option 1, Option 2, Option 3 and Option 4.

A default option need not be selected and the data need not be submitted at this juncture.

Sample Output



3.5.4 Checkboxes

Checkboxes are usually used for a set of related options where more than one option can be selected out of the available options.

Checkboxes also offer the flexibility to deselect an option after it has been selected. This would also mean that there can be zero options selected (if the form is designed to allow so).

To create checkboxes, the type attribute of the <input> tag should be set to the value "checkbox". A possible version of the HTML script is shown below:

Let us take a closer look at the <input> tags in the script.

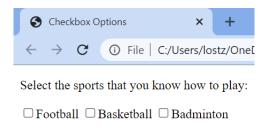
```
<input type="checkbox" name="sport" value="football">Football
<input type="checkbox" name="sport" value="basketball">Basketball
<input type="checkbox" name="sport" value="badminton">Badminton
```

Notice that all three <input> tags share the same value for the name attribute: "sport".

This allows for the values of all the options selected to be sent to the server as an array with the name "sport" when the form is submitted.

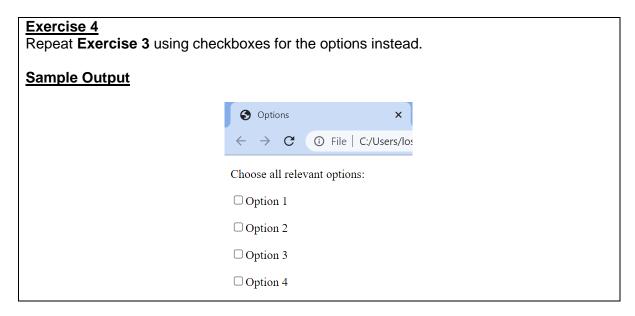
As with radio buttons, the positioning of each checkbox label can be adjusted to the front or back of the checkbox by placing the label either before or after the <input> tag.

When the form is generated, it will look as follows:



Observe also that the options appear in the same line. To have each option on a separate line, place each <input> tag within a set of paragraph tags Alternatively, use the
br> tag.

In the above script, the form is created using the **POST** method. Depending on the requirements, the form can also be created using the **GET** method.



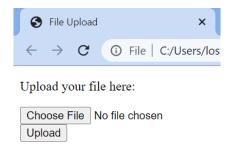
3.5.5 File Upload

To upload files, we must use the **POST** method. We cannot send files using the **GET** method. Why?

This type of input may appear differently on different browsers: some creates a box that looks like a text input box with a "Browse" button. On the Chrome and Safari browsers, a "Choose File" button with a text "No file chosen" or the name of the file chosen by the user.

To create a file upload feature, the type attribute of the <input> tag should be set to the value "file". A possible version of the HTML script is shown below:

When the form is generated, it will look as follows:



Observe that there are two buttons in the output generated. The first button "Choose File" is the file upload feature created by the tag:

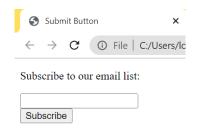
```
<input type="file" name="userfile">
```

The second button "Upload" is a submit button. Upon clicking the "Upload" button, the selected file will be sent to the server. More details on the submit button will be discussed in the next sub-section.

3.5.6 Submit Button

A submit button is a clickable button used to send form data to a web server for processing. When a user clicks on the submit button, the form data is sent to the server using either the **GET** or **POST** method.

To create a submit button, the type attribute of the <input> tag should be set to the value "submit". A possible version of the HTML script is shown below:



Notice that in the previous sub-section, the label of the submit button was "Upload". In the above example, the label of the submit button has been changed to "Subscribe". The label is controlled using the value attribute, which is used to specify the words that appear on the submit button. When the value is not specified, the default value of the button is "Submit" on some browsers, including the Chrome browser.

3.5.7 Image Button

Instead of a conventional submit button, the submit button can be created using an image. This results in an image button.

To create an image button, the type attribute of the <input> tag should be set to the value "image". In addition the source "src" attribute must be set to the path of the image that is to be used.

A possible version of the HTML script is shown below:

Notice from the script that there is a width attribute, a height attribute and an alt attribute.

The width and height attribute allows resizing of the image to create an appropriately sized button.

The alt attribute allows a text to be specified and displayed when the image used for the button cannot be loaded.

Subscribe to our email list:		Subscribe to our email list:	
	Submit		Submit form

3.5.8 Date Input

A date input allows for typewritten dates to be entered. In addition, some browsers will also provide a calendar to select the required date.

To create a date input, the type attribute of the <input> tag should be set to the value "date". A possible version of the HTML script is shown below:

When the form is generated, it will look as follows:

Enter your birthday:

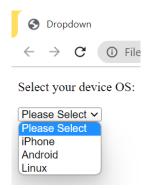
3.5.9 Dropdown List

A dropdown list allows you to select an option from a list of options

To create a date input, the type attribute of the <input> tag should be set to the value "date". A possible version of the HTML script is shown below:

```
<!doctype html>
<html>
    <head><title>Dropdown</title></head>
    <body>
        <form action="http://127.0.0.1:5000" method="post">
            Select your device OS:
            <select name="devices">
                <option value="" selected="selected">Please
                Select</option>
                <option value="Windows">iPhone</option>
                <option value="macOS">Android</option>
                <option value="Linux">Linux</option>
            </select>
        </form>
    </body>
</html>
```

When the form is generated, it will look as follows:



Observe that the "Please select" label in the dropdown list is created using the following tag:

```
<option value="" selected="selected">Please Select</option>
```

This is not an actual option. As such the value attribute is set to "".

Notice that a **selected** attribute with value set to **selected** is used. If this is not done, the first option (**iphone** in this case) will be shown when the page loads.

When using a dropdown list, if no option is selected, the first item in the dropdown list will be sent to the server when the form is submitted.

The dropdown list has the same functionality as a set of radio buttons. The difference being a set of radio buttons allow users to see all the available options at a glance as compared to a dropdown list which may sometimes require scrolling (especially when the list is long).

3.5.10 Multiple Selection Box

A multiple selection box allows for the selection of more than one option. It is created using a <select>...</select> tag by setting the value of the multiple attribute to multiple.

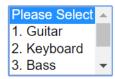
A size attribute is used to specify the number of options to display at once.

When creating a multiple selection box, it is a good practice to tell the user they can use the control/command key on the PC/Mac while selecting the options.

A possible version of the HTML script is shown below:

```
<!doctype html>
<html>
    <head><title>Multiple Selection</title></head>
    <body>
        <form action="http://127.0.0.1:5000" method="post">
            Select the musical instruments which you know
            <br>
            (You can select more than one option by holding down
            control on a PC or command key on a Mac while selecting
            different options)
            <select name="instruments" size="4"</pre>
            multiple="multiple">
                <option value="" selected="selected">Please
                Select</option>
                <option value="Guitar">Guitar</option>
                <option value="Keyboard">Keyboard</option>
                <option value="Bass">Bass</option>
                <option value="Piano">Piano</option>
                <option value="Flute">Bass</option>
            </select>
        </form>
    </body>
</html>
```

When the form is generated, it will look as follows:



Notice that the size of 4 includes the dummy option "Please select".

3.5.11 Large Text Input

What happens when you enter multiple lines of text?

The <textarea>...</textarea> tag can be used to do so.

A possible version of the HTML script is shown below:

A text input box of 20 characters in width and 4 rows in height is generated.

What do you think about the movie?

```
Enter your comments
...
```

3.6 Grouping Elements

Different form elements can be grouped together for easy classification using the <fieldset>...</fieldset> tag.

The <legend>...</legend> tag can be used to include a header for the grouped elements.

A possible version of the HTML script is shown below:

```
<!doctype html>
<html>
   <head><title>Grouped Elements</title></head>
   <body>
        <form action="http://127.0.0.1:5000" method="post">
            <fieldset>
                <legend>Contact Details</legend>
                Name: <br>
                <input type="text" name="name"><br>
                Email:<br>
                <input type="text" name="email"><br>
                Mobile:<br>
                <input type="text" name="mobile">
            </fieldset>
        </form>
   </body>
</html>
```

The following form will be generated:



Exercise 5

Create the form shown in the first page of this set of notes.