Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere, Tikologo ya Kago le Theknolotši ya Tshedimošo

DEPARTMENT OF INFORMATICS

INF 272

SEMESTER TEST (1)		DATE: 2021-06-18

Examiners	:	Dr. JP van Deventer	Time	:	180 min
	:	Prof. MC Matthee			
	:	Mr. R Hanslo			
	:	Mr. C Saunders			
	:	Mr. J Pienaar			
Moderator / External Examiner	:	Dr T Mawela	Marks	:	30

Student Number								Surname	Initials
--	--	--	--	--	--	--	--	**MEMO**	**MEMO**

Question Section	Module outcomes (as in Study Guide)					Marks allocated	Maximum mark
	MO1	MO2	MO3	MO4	MO5		
Section A	XX				XX		10
Section B	XX				XX		10
Section C	XX				XX		10
Total							30

Instructions

1. This paper consists of 3 sections with several main questions (sub-sets of instructions) each.
2. Each section relates to a small semi-complete program that needs to be updated or finalised.
3. Each question relates to a file in one of the programs that you need to update or finalise.
4. Each sub-sets of instructions relates to activities and tasks in one of the files.
5. Each main question relates to a file that needs to be edited in one of the three programs you have been provided with.
6. Answer all the questions – there are no optional questions.
7. Please read all questions, instructions and sub-sets of tasks very carefully.
8. After completing work on a relevant question, please upload ONLY the edited file to the correct upload area.

The University of Pretoria commits itself to produce academic work of integrity. I affirm that I am aware of and have read the Rules and Policies of the University, more specifically the Disciplinary Procedure and the Tests and Examinations Rules, which prohibit any unethical, dishonest or improper conduct during tests, assignments, examinations and/or any other forms of assessment. I am aware that no student or any other person may assist or attempt to assist another student, or obtain help, or attempt to obtain help from another student or any other person during tests, assessments, assignments, examinations and/or any other forms of assessment.
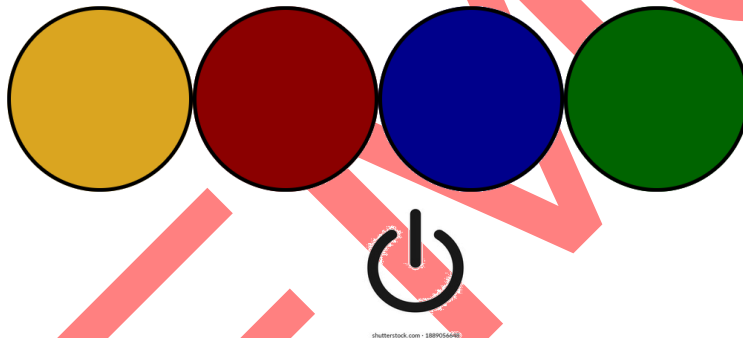
- Download the zipped folder named "**INF272SemesterTest1SectionA.zip**". Unzip the folder on a local drive. In the folder you will find the following files:
    - Index.html – containing the HTML for this project
    - PowerOn.jpg
    - style.css
    - script.js – the JavaScript file.

- You need to extract the source files first from the zip file.
- In other words, unzip the folder from the zip file and copy the unzipped folder to, for example, your C: or D: drive.

Your task is to complete the code in the **JavaScript file** in order to get this application to function as described below.

The program is a simulation of the turning on or off of fairy lights. Only four "light bulbs" have been created with CSS and HTML (already provided in the .css file and .html file). When the user clicks the "power on" image, the image becomes more transparent (the opacity changes), and the lights bulbs start to blink. When the user clicks the "power on" image again, the opacity changes back to what it was, and the lights bulbs stop blinking. The blinking of the lights should happen in random order, one after the other. The blinking of the lights is simulated by changing the background color to a lighter shade.

A video is available in the test folder to demo the functionality of the application.

The steps required to achieve this have been broken down into separate questions. For each question, please do the following:
- Read the instructions carefully.
- Look for comments (hints) in the provided sample solution. The comments will guide you in terms of where the code is required.
- Apply the necessary code changes to the specified file in the required application.
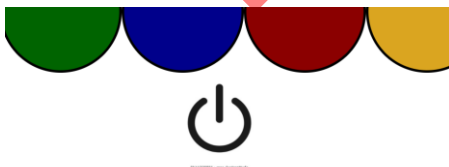- After completing this section, only upload the *script.js* file to ClickUP as part of your answer.

(**IMPORTANT:** **DO NOT UPLOAD ZIP, TAR, RAR or SLN files**)

SECTION A - QUESTION 1 - Starting and stopping the game   (4 MARKS)

In this section you need to write the code to start and stop the lights. This is where the opacity of the image should be toggled and where you will use the setInterval function.

Power off

Power on

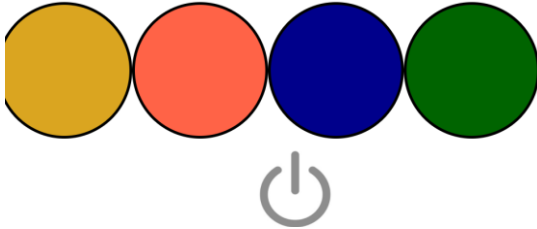### SECTION A - QUESTION 2 – Get the lights bulbs to blink   (6 MARKS)

In this section you need to write the code to get the light bulbs to blink in random order. The lights bulbs will light up for 300ms, turn off for 300ms before the next one lights up for 300ms, turns off for 300ms etc. This means that every 600ms another light bulb will light up.
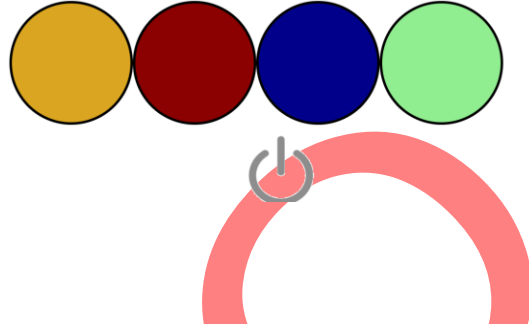
You can simulate the "shining" of the light bulbs by changing the background color to a lighter shade of the same color. We suggest the following: change the yellow bulb to "yellow", the red bulb to "tomato", the blue bulb to "lightskyblue" and the green bulb to "lightgreen".   You can use the setTimeout method in this section.

NOTE: If you cannot manage the random blinking of the light bulbs, for less marks (3 marks), you can write the code for the light bulbs to light up sequentially from left to right starting again from left to right until the "power on" image is clicked again.

Screenshot showing the red bulb lighting up

Screenshot showing the green bulb lighting up

SOLUTION FOR SECTION A

```javascript
window.addEventListener("load", function() {


//declare variables
let imgPlay = document.getElementById("powerimg");
imgPlay.style.opacity = "1";

//add event listener to the image
imgPlay.addEventListener('click', function() {
   play();
});

//start the game
function play() {
    if (imgPlay.style.opacity == "1")
    {
        intervalID = setInterval(Blinking, 600);
        imgPlay.style.opacity = "0.5";
    }
    else if(imgPlay.style.opacity == "0.5")
    {
        clearInterval(intervalID);
        imgPlay.style.opacity = "1";
    }
}

//create random number and call color setters.
function Blinking() {

  let randomNum = Math.floor(Math.random() * 4);
  setTimeout(function() {setColor(randomNum);}, 300);
  setTimeout(function() {resetColor(randomNum);}, 600);

}
```

```javascript
//setting the light color
function setColor(i)
{
    let light = document.getElementById(i);

    if (light.className == "yellow")
    {
     light.style.backgroundColor = "yellow";
    }
    if(light.className == "red")
    {
     light.style.backgroundColor = "tomato";
    }
    if(light.className == "blue")
    {
     light.style.backgroundColor = "lightskyblue";
    }
    if(light.className == "green")
    {
     light.style.backgroundColor = "lightgreen";
    }
}

//resetting to the darker color
function resetColor(i)
{
    let light = document.getElementById(i);

    if (light.className == "yellow")
    {
     light.style.backgroundColor = "goldenrod";
    }
    if(light.className == "red")
    {
     light.style.backgroundColor = "darkred";
    }
    if(light.className == "blue")
    {
     light.style.backgroundColor = "darkblue";
    }
    if(light.className == "green")
    {
     light.style.backgroundColor = "darkgreen";
    }
}
});
```

SECTION A TOTAL   **10**

For Section B, you need to complete two questions; a **JQuery** question and a **Bootstrap** question.
- All the source files are in the "**INF272SemesterTest1SectionB.zip**" file.
- You need to extract the source files first from the zip file.
- In other words, unzip the folder from the zip file and copy the unzipped folder to, for example, your C: or D: drive.

Once you have completed the 2 questions in this section, upload the ***about.html*** file and the ***consultation.html*** file to the Section B upload slot.

Your task is to complete the code base in order to get this application to function as described below. The steps required to achieve this have been broken down into separate questions. For each question, please do the following:
- Read the instructions carefully.
- Look for comments (hints) in the provided sample solution. The comments will guide you in terms of where the code modifications are required.
- Apply the necessary code changes to the specified file in the required application.
- Only upload the modified file associated with the question to ClickUP.

(**IMPORTANT: DO NOT UPLOAD ZIP, TAR, RAR or SLN files**)

SECTION B - QUESTION 1 (Bootstrap)	(5 MARKS)

Only upload the ***about.html*** file after completing this question.

- For this question you need to display the **about.html** page using the **bootstrap-grid**.
- The grid layout must be created in the **div** with the **div class="container"** class.
- The correct text should be displayed and the correct grid layout as explained below.
- *NB: In terms of heading size (for each column) and list type (for the 4th column), you can use your own discretion.*
- The **text** to place in the Bootstrap grid columns are provided in the **index.html** page of the application.
- Once you are done with this question, you must only upload the **about.html** file.

Q1 Expected Output

a) When the screen is displayed in the Large (≥992px) and Extra large (≥1200px) sizes it must display 4 columns in a row.

Department	Degree	Description	Objectives
Department of Informatics.	BCom (Informatics Information Systems) and BIT (Information Systems).	Our program educational objectives for the BCom (Informatics Information Systems) program and BIT (Information Systems) are:	1. PO_01: The Informatics / Information Systems graduate must have a broad business understanding and real-world perspective to be Information Systems enablers in organizations and understand the strategic significance of

b) When the screen is displayed in the Medium (≥768px) size it must display 3 columns in a row. The remaining columns are stacked/placed below.

Department	Degree	Description
Department of Informatics.	BCom (Informatics Information Systems) and BIT (Information Systems).	Our program educational objectives for the BCom (Informatics Information Systems) program and BIT (Information Systems) are:

Objectives

1. PO_01: The Informatics / Information Systems

c) When the screen is displayed in the Small (≥576px) size it must display 2 columns in a row. The remaining columns are stacked/placed below.

Department

Department of Informatics.

Degree

BCom (Informatics Information Systems) and BIT (Information Systems).

Description

Our program educational objectives for the BCom (Informatics Information Systems) program and BIT (Information Systems) are:

Objectives

1. PO_01: The Informatics / Information Systems graduate must have a broad business understanding and real-world perspective to be Information Systems enablers in organizations and understand the strategic significance of Information Systems.

d) When the screen is displayed in the Extra small (< 576px) size it must display 1 column in a row. In other words, they must be stacked below each other.

Department

Department of Informatics.

Degree

BCom (Informatics Information Systems) and BIT (Information Systems).

Description

Our program educational objectives for the BCom (Informatics Information Systems) program and BIT (Information Systems) are:

Objectives

1. PO_01: The Informatics / Information Systems graduate must have a broad business understanding and real-world perspective to be Information Systems enablers in

SOLUTION FOR SECTION B QUESTION 1
(….please note that simple text that does not count towards marks have been omitted….)

```html
<head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>Responsive Web Design - About</title>
    <link rel="stylesheet" href="css/bootstrap.css">
    <link rel="stylesheet" href="css/main.css">
</head>
<body>
    <header>
        <nav class="navbar navbar-expand-sm navbar-dark bg-dark fixed-top">
            <a class="navbar-brand" href="index.html">INF272</a>
                <button class="navbar-toggler" type="button" data-
                        toggle="collapse" data-target="#collapseNavbar">
                    <span class="navbar-toggler-icon"></span>
                </button>
                <div class="collapse navbar-collapse" id="collapseNavbar">
                    <ul class="navbar-nav ">
                        <li class="nav-item"><a class="nav-
                            link" href="index.html">Bootstrap Instructions</a></li>
                        <li class="nav-item "><a class="nav-link" href="jquery-
                            instructions.html">jQuery Instructions</a></li>
                        <li class="nav-item active"><a class="nav-
                            link" href="about.html">About</a></li>
                        <li class="nav-item "><a class="nav-
                            link" href="consultation.html">Consultation</a></li>
                    </ul>
                </div>
        </nav>
    </header>
    <div id="wrapper" class="m-3">
        <div id="page-content-wrapper" class="p-1">
            <div class="container">
                <h3>Informatics <br/> <small> ..details omitted here.</small></h3>
            </div>
            <div class="container">

                <div class="row">
                    <div class="col-lg-3 col-md-4 col-sm-6">
                        <h5>Department</h5>
                        <hr/>
                        <p>Department of Informatics.</p>
                    </div>
                    <div class="col-lg-3 col-md-4 col-sm-6">
                        <h5>Degree</h5>
                        <hr/>
                        <p>BCom  ...html file details omitted here.p>
                    </div>
                    <div class="col-lg-3 col-md-4 col-sm-6">
                        <h5>Description</h5>
                        <hr/>
```

```html
                    <p>Our program  ...html file details omitted here.</p>
                </div>
                <div class="col-lg-3 col-md-4 col-sm-6">
                    <h5>Objectives</h5>
                    <hr/>
                    <p>
                        <ol>
                            <li>PO_01: ...html file details omitted here.</li>
                            <li>PO_02: ...html file details omitted here.</li>
                            <li>PO_03: ...html file details omitted here.</li>
                            <li>PO_04: ...html file details omitted here.</li>
                            <li>PO_05: ...html file details omitted here.</li>
                            <li>PO_06: ...html file details omitted here.</li>
                        </ol>
                    </p>
                </div>
            </div>
        </div>
    </div>
    <script src="javascript/jquery.min.js"> </script>
    <script src="javascript/bootstrap.js"> </script>
</body>
```

- For this question, you must **Not** create any html, you must only create the JQuery in the **form submit** and the **consultModal** function of the **script** section in the **consultation.html** file.
- You must use JQuery, **Not** Javascript or any additional JQuery plugins or packages for the below requirements.
- However, you can use Javascript for none jQuery related code, such as logic and conditional statements.
- Once you are done with this question, you must only upload the **consultation.html** file.

Q1 Expected Output

a) In the **consultation.html** file you need to perform validation on the Form controls marked as **required**. In other words, if no information is entered inside either the **First Name**, **Last Name**, or **Email** controls then, that control, should be highlighted when the **Submit** button is clicked. This means that these **required** fields must have information before proceeding.

b) Thereafter, clicking the **Submit** button the information entered in the form controls must be displayed inside the **div** of the bootstrap modal with the **class="modal-body"** class name.

c) Thereafter, when you click the **Close** button on the modal pop-up, the modal must close and the form controls must be cleared.

Booking Success ✕

First Name: Tony Last Name: Stark Email: tony@stark.com
Comments: Stark industries

[Close]

Consultation
Book a consulation with your Lecturer.

Your details

First Name | Last Name
Enter your first name (required) | Enter your last name (required)

Email
@ | Enter your email address (required)

Comments

[Submit]

SOLUTION FOR SECTION B QUESTION 2
(….please note that simple text that does not count towards marks have been omitted….)

```html
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <title>Responsive Web Design - Consultation</title>
        <link rel="stylesheet" href="css/bootstrap.css">
        <link rel="stylesheet" href="css/main.css">
    </head>
    <body>
    <header>
        <nav class="navbar navbar-expand-sm navbar-dark bg-dark fixed-top">
            <a class="navbar-brand" href="index.html">INF272</a>
                <button class="navbar-toggler" type="button" data-
                        toggle="collapse" data-target="#collapseNavbar">
                    <span class="navbar-toggler-icon"></span>
                </button>
                <div class="collapse navbar-collapse" id="collapseNavbar">
                    <ul class="navbar-nav ">
                        <li class="nav-item"><a class="nav-
                            link" href="index.html">Bootstrap Instructions</a></li>
```

```html
                            <li class="nav-item "><a class="nav-link" href="jquery-
                                instructions.html">jQuery Instructions</a></li>
                            <li class="nav-item"><a class="nav-
                                link" href="about.html">About</a></li>
                            <li class="nav-item active"><a class="nav-
                                link" href="consultation.html">Consultation</a></li>
                    </ul>
                </div>
        </nav>
    </header>
        <div id="wrapper" class="m-3">
            <div id="page-content-wrapper" class="p-1">
                <div class="container">
                    <h3>Consultation <br/> <small>Book .........</small></h3>
                    <div class="row border border-dark rounded">
                        <div class="col-md-10">
                            <h5> Your details</h5>
                            <form action="#" method="get" id="consultForm">
                                <div class="row">
                                    <div class="col-md-4 form-group ">
                                        <label for="firstName">First Name</label>
                                        <input type="text" class="form-
                                            control" id="firstName"
                                            placeholder="Enter your
                                            first name (required)"/>
                                    </div>
                                    <div class="col-md-4 form-group">
                                        <label for="lastName">Last Name</label>
                                        <input type="text" class="form-
                                            control" id="lastName"
                                            placeholder="Enter your last
                                            name (required)"/>
                                    </div>
                                </div>
                                <div class="row">
                                    <div class="col-md-6 form-group">
                                        <div class="form-group">
                                            <label for="email">Email</label>
                                            <div class="input-group">
                                                <div class="input-group-prepend">
                                                    <span class="input-group-
                                                        text">@</span>
                                                </div>
                                                <input type="text" class="form-
                                                    control" id="emailAddress"
                                                    placeholder="Enter your
                                                    email address (required)"/>
                                            </div>
                                        </div>
                                    </div>
                                </div>
                                <div class="row">
                                    <div class=" col-md-8 form-group">
```

```html
                                    <label for="comments">Comments</label>
                                    <textarea class="form-control"
                                            id="comments" rows="5"></textarea>
                            </div>
                        </div>
                        <div class="row">
                            <div class=" col-md-2">
                                <button class="btn  btn-success btn-block mb-2"
                                        type="submit">Submit</button>
                            </div>
                        </div>
                    </form>
                </div>
            </div>
        </div>
    </div>


    <!-- Modal -->
    <div class="modal fade" id="consultModal" tabindex="-1" role="dialog" aria-
          labelledby="consultModalLabel" aria-hidden="true">
        <div class="modal-dialog" role="document">
        <div class="modal-content">
            <div class="modal-header">
            <h5 class="modal-title" id="consultModalLabel">Booking Success</h5>
            <button type="button" class="close" data-dismiss="modal" aria-label=
                    "Close">
                <span aria-hidden="true">&times;</span>
            </button>
            </div>
            <div class="modal-body">
                <!--The form information must be displayed here-->
            </div>
            <div class="modal-footer">
            <button type="button" class="btn btn-secondary" data-dismiss="modal">
                    Close</button>
            </div>
        </div>
        </div>
    </div>
    <script src="javascript/jquery.min.js"></script>
    <script src="javascript/bootstrap.js"></script>
    <script>
        $("form").submit(function(e){
            let firstname = $('#firstName');
            let surname = $('#lastName')
            let emailaddress = $('#emailAddress')
            let comments = $('#comments')
```

```
                    if (firstname.val() == '')
                    {
                        firstname.focus();
                        return false;
                    }
                    if (surname.val() == '')
                    {
                        surname.focus();
                        return false;
                    }
                    if (emailaddress.val() == '')
                    {
                        emailaddress.focus();
                         return false;
                    }

                    consult_str = "Firstname: " + firstname.val() + " Surname: " +
                     surname.val()+ " Email Address: " + emailaddress.val() + "
                     Comments: " + comments.val();

                    $(".modal-body").html(consult_str);

                    $('#consultModal').modal('toggle');

                    e.preventDefault();
                });

            $('#consultModal').on('hidden.bs.modal', function (e) {
                $("#consultForm").trigger('reset');
            })
        </script>
    </body>
</html>
```

SECTION B TOTAL   **10**

SECTION C – MODEL VIEW CONTROLLER (10)

For Section C, you need to complete two questions; a **cshtml** question and a **controller.cs** question.
- All the source files are in the "**INF272SemesterTest1SectionC.zip**" file.
- You need to extract the source files first from the zip file.
- In other words, unzip the folder from the zip file and copy the unzipped folder to, for example, your C: or D: drive.

Once you have completed the 2 questions in this section, upload the ***Question01.cshtml*** file and the ***Question02Controller.cs*** file to the Section C upload slot.

Your task is to complete the code base in order to get this application to function as described below. The steps required to achieve this have been broken down into separate questions. For each question, please do the following:
- Read the instructions carefully.
- Look for comments (hints) in the provided sample solution. The comments will guide you in terms of where the code modifications are required.
- Apply the necessary code changes to the specified file in the required application.
- Only upload the modified file associated with the question to ClickUP.

PLEASE NOTE: You will get errors in this section as there is code missing. When all the code is completed and all the references are used then the errors will disappear. If you want to test certain sections then you will have to edit out the sections referencing incomplete code.

(**IMPORTANT:** **DO NOT UPLOAD ZIP, TAR, RAR or SLN files**)

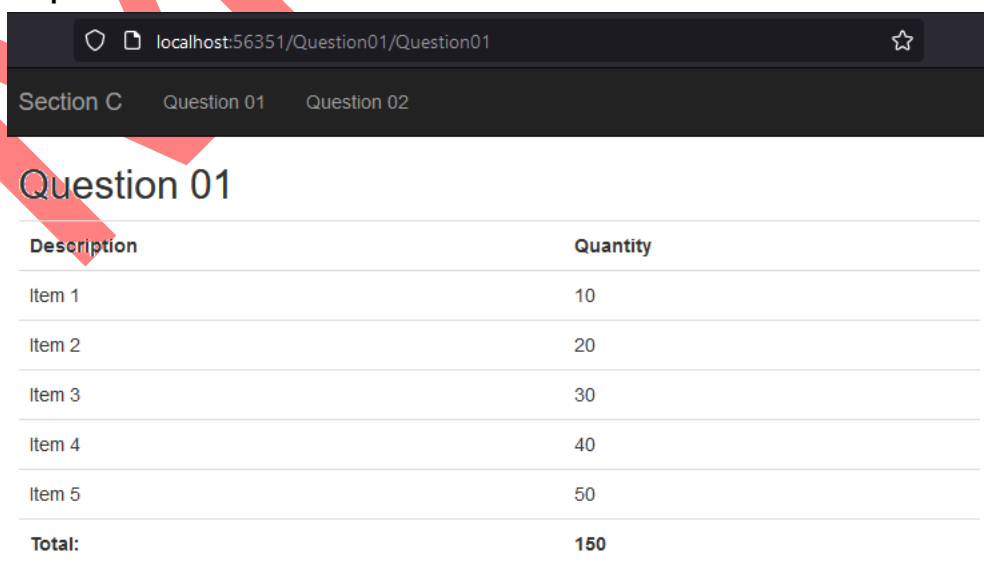### SECTION C - QUESTION 1   (5 MARKS)

*Only upload the **Question01.cshtml** file after completing this question.*

The controller for this question has a single action (Question01) that returns a list of Items. The Question01Model can be found in the Models folder and is already completed. The class has two data members Description and Quantity. The Question01 action already has a corresponding View that you are required to modify in order to display every item in the list as well as the total quantity of everything in the list (see the screenshot below).

You are given a partially completed view Question01.cshtml. Modify / Complete the code such that you loop through the list of Items and display its Description and Quantity as cells in a table. **Write Razor code to calculate and display the Total Quantity as the sum of the Items in the list.**

Hint: do not over complicate your answer – it is a simple calculation using Razor.

Q1 Expected Output

SOLUTION FOR SECTION C QUESTION 1

```
@model IEnumerable<INF272_SemesterTest01_SectionC.Models.Question01Model>

@{
    ViewBag.Title = "Question 01";
    double totalQuantity = 0;
}

<h2>Question 01</h2>


<table class="table">

    <tr>
        <th>Description</th>
        <th>Quantity</th>
    </tr>

    @foreach (var Question01 in Model)

    {
        totalQuantity += Question01.Quantity;

        <tr>
            <td>@Question01.Description</td>
            <td>@Question01.Quantity</td>
        </tr>
    }
<tr>
    <td><b>Total:</b></td>
    <td><b>@totalQuantity</b></td>
</tr>

</table>
```

*Only upload the **Question02Controller.cs** file after completing this question.*

The controller for this questions has two actions, a GET and POST action, one that displays the Question02 View, and one that receives data posted to it. The completed Question02 View has a form that requires the user to enter data into two password fields. You will be required to complete the controller code to receive the data and perform validation on the fields as well as return a message stating whether the entered details are valid as seen below.

Perform a check to ensure that the entered passwords match.

Hint: do not over complicate your answer – keep it simple!!!

Q1 Expected Output (Example 1)

Q1 Expected Output (Example 2)

SOLUTION FOR SECTION C QUESTION 2

```csharp
using System.Web.Mvc;
namespace INF272_SemesterTest01_SectionC.Controllers
{
    public class Question02Controller : Controller
    {   // GET: Question02
        [HttpGet]
        public ActionResult Question02() => View();

        [HttpPost]
        public ActionResult Question02(string password, string passwordConfirm)
        {
            bool valid = true;
            if (!password.Equals(passwordConfirm))
            { valid = false; }
            ViewBag.ValidationMessage = valid ? "Passwords match!" :
                                        "Passwords do not match!";
            return View();
        }}}
```

| SECTION C TOTAL | 10 |