DIXONS SIXTH FORM ACADEMY

SUMMER WORK

A LEVEL COMPUTER SCIENCE

2024

STUDENT NAME:

Contents

About the Summer Work

This booklet contains a number of tasks that students are expected to complete to a good standard in order to be able to be enrolled in this subject.

The tasks are to do research and then learn how to put that information into a website of interlinked webpages using HTML code.

Please do the following:

1. complete the Tasks as directed
2. compress the folder and send it to jpatel@dixons6a.com (see Task 10 for this)

There is also a section on additional work for learning some web programming. This is not compulsory but it would be very good if you could complete this!

What you will need

Details about the software you will need are included in the Tasks.

Welcome to Computer Science

Subject outline

One perception of Computer Science is that it is forever changing. Technology has evolved so much that we live in a world where it is difficult to image life without computerised systems. However, this evolving technology is built upon some solid foundations that have stood since its inception – this is Computer Science.

There are three main strands to Computer Science, and these form our "Big Picture Questions":

- How do computers work?
- How do computers communicate and work together?
- How do we make computers work for us?

Everything that we will do falls under one of these questions.

At Dixons we study AQA A level Computer Science which is breaks down these themes further and examines them in three parts:

1. Paper 1:

   This paper tests your ability to program, as well as some theoretical knowledge of Computer Science around the question "**How do we make computers work for us?**"

2. Paper 2:

   This paper tests theoretical knowledge of Computer Science around the questions "**How do computers work?**" and "**How do computers communicate and work together?**"

3. NEA:

   The non-exam assessment assesses your ability to use the knowledge and skills gained through the course to solve or investigate a practical problem. You will be expected to follow a systematic approach to problem solving,

What an Excellent Student "Looks Like"

To study computer science and get the best out of it you need to have three main attributes:

1. You need to have, or be developing, excellent coding skills.

   These are:

   - good programming habits,
   - good use of programming techniques
   - being able to problem solve quickly
   - being able to code across several programming languages

2. You need to have excellent mathematical ability.

   In reality, computer science is applied mathematics so you need to have a very good grasp of it and be agile in your thinking!

3. You need to be hard working, well-organised, concentrate well and be resilient

   Computer Scientists are design engineers and often have to work at a problem over a long period of time. Sometimes things can go wrong and you have to start again. You will get frustrated and you need to show good resilience.

   A lot of work and practice needs to take place outside of lesson time so you need to be able to concentrate well wherever you are and organise your time well.

Coding and Theory Blocks

Throughout the course, you will be completing a program of Coding Blocks and Theory Blocks. These are designed to ensure that you have the correct competences to sit both exam papers and complete your NEA. For each Block you will take a competency test and build up a set of Blocks to show your progress.

Careers & Higher Education

Need some Inspiration?

Computer Science matters!!! Watch This

Computer Science is everywhere!! Watch this

Computer Science is for everyone!!! Watch this

Many careers are linked to Computer Science. Many students who take this course want to go on to a career as a programmer – maybe you could be the next Bill Gates or Mark Zuckerberg!

In terms of the local area, there are many new niche sectors beginning to develop that will require computer scientists in new media and telecoms, research and development in heavy and light industries and growing Small/Medium sized Enterprises.

Below are some link to places that you can look for more information and inspiration:

A sample of Universities

Computer Science at Oxford University

Computer Science at Cambridge University

Computer Science at Manchester University

Some Different Careers

What can you do with a Computer Science Degree?

BBC Software Engineering Apprenticeships

KPMG Software Engineering Apprenticeships

Degree Apprenticeships in Aerospace Software Development

GCHQ Careers

Links to key information:

Click here for the Course Information Guide on our website

Click here for the AQA Specification for A Level Computer Science

Coding Block 1

Our topics are organised into Blocks for Coding and Theory. For this Coding Block, you need to be able to demonstrate that you can:

1. Build interlinked web pages using the Bootstrap Framework that incorporate:
    a. contextual menu/navigation bar
    b. organised content comprising images, text and video
    c. links to other pages
2. Demonstrate that you can logically organise information. In this case:
    a. contextual menu/navigation bar
    b. organised content comprising images, text and video
    c. links to other pages

You will need to use the reference [W3Schools Bootstrap 5 Tutorial]

You will complete 9 Tasks for Coding Block 1 Summer Work:

- Task 1: Compile your Content (3.5 hours)
- Task 2: About Bootstrap Webpages (30 mins)
- Task 3: Setting up Folders for your Webpages (30 minutes)
- Task 4: Build a Basic Bootstrap Webpage (1 hour)
- Task 5: Add Text and Styling to a Bootstrap Webpage (1 hour)
- Task 6: Add Images to a Bootstrap Webpage (30 minutes)
- Task 7: Add Video to a Bootstrap Webpage (30 minutes)
- Task 8: Build Individual Webpages (3-4 hours)
- Task 9: Add a Menu/Navigation Bar to a Bootstrap Webpage (1 hour)

Summer Work Tasks

Task 1: Compile Your Content for the Website (approx. 3.5 hours):

Before you make the website, you need to the information that will go onto it. This includes text, images and video. You will make a website to present information about a computer.

You need to do research by using the internet and making notes, saving images and links to videos that you would like to use. To help you to do this well, the task has been broken down into 30 minute chunks as follows:

1a. What is a Computer? (approx. 30 mins)

1. Do research and make notes about the different types of Computer that there are
2. Do research and make notes about what a Computer can do
3. Do research and make notes about what a Computer can't do
4. During your research:
    a. save some images that you would like to put on your webpages
    b. save links to videos that you may like to include on your webpages

1b. What is a Processor? (approx. 30 mins)

1. Do research and make notes about processors (or CPUs) that there are. Make sure that you know the answers to the following questions:
    a. What is a Processor?
    b. What do the numbers mean?
    e.g. a new computer may be advertised as having - Intel® Core™ i5-12400 Processor, Hexa-core at 2.5 GHz / 4.4 GHz with 18 MB cache
    c. What is the difference between a processor for an AppleMac and a PC?
2. During your research:
    a. save some images that you would like to put on your webpages
    b. save links to videos that you may like to include on your webpages

1c. What are Input devices? (approx. 30 mins)

1. Do research and make notes about the different types of input devices that there are. Make sure that you know the answers to the following questions:
    a. What is the purpose of a mouse and keyboard?
    b. How can the computer be operated by voice?
    c. What does a scanner do?
    d. What does a barcode scanner do?
    e. What does a camera do?
2. During your research:
    a. save some images that you would like to put on your webpages
    b. save links to videos that you may like to include on your webpages

1d. What are Output devices? (approx. 30 mins)

1. Do research and make notes about the different types of output devices that there are. Make sure that you know the answers to the following questions:
    a. What is the purpose of a screen or monitor?
        i. What does screen resolution mean?
    b. What is the purpose of a speaker or headphones?
    c. What does a printer provide?
2. During your research:
    a. save some images that you would like to put on your webpages
    b. save links to videos that you may like to include on your webpages
    c. save links to any music that you may like to include on your webpages

1e. What is computer memory? (approx. 30 mins)

1. Do research and make notes about computer memory 9 or RAM). Make sure that you know the answers to the following questions:
    a. What is the purpose of memory/RAM?
    b. What do the numbers mean?
    e.g. a new computer may be advertised as having 8MB RAM
    c. What is the maximum amount of RAM that you can have in a Personal Computer?
2. During your research:
    a. save some images that you would like to put on your webpages
    b. save links to videos that you may like to include on your webpages

1f. What are Storage devices? (approx. 30 mins)

1. Do research and make notes about the different types of storage devices that there are. Make sure that you know the answers to the following questions:
    a. What is a Hard Disk Drive (HDD)?
    b. What is a Solid State Drive (SSD)?
    c. What do the numbers mean?
    e.g. a new computer may be avertised as having 512GB SSD
    d. What is the maximum amount of Storage that you can have in a Personal Computer?
2. During your research:
    a. save some images that you would like to put on your webpages
    b. save links to videos that you may like to include on your webpages

1f. How does a computer connect to the world? (approx. 30 mins)

1. Do research and make notes about the different types of connections that there are for computers. Make sure that you know the answers to the following questions:
    a. What is an ethernet connection?
    b. What is a WiFi™ connection?
    c. What is a Bluetooth™ connection?
2. During your research:
    a. save some images that you would like to put on your webpages
    b. save links to videos that you may like to include on your webpages

1g. What is Software for a computer? (approx. 30 mins)

1. Do research and make notes about the different types of Operating Systems that there are. Make sure that you know the answers to the following questions:
    a. What is the Windows Operating System?
    b. What is MacOS?
    c. What is Android?
    d. What different programming Languages are there and what are they used for? Watch this video: https://youtu.be/7bE2mI4ePeU
2. During your research:
    a. save some images that you would like to put on your webpages
    b. save links to videos that you may like to include on your webpages

Task 2: About Bootstrap Webpages (approx. 30 mins)

For this task you will find out about how webpages are constructed using HTML code and CSS.

Bootstrap is a framework for laying out and styling a webpage in a particular way. It is a very popular framework.

2a. Find out about a basic Bootstrap webpage

1. Watch this video (start to 5:38) about Basic Webpages and make sure that you understand it.
2. Try making your own "Hello World" basic webpage using W3Schools.

Task 3: Setting up Folders for your Webpages (approx: 30 mins)

All websites are made up of files inside folders.

As you should have seen in Task 2 a webpage is text made up of html code so, to save a webpage it must be stored as a file.

Specifically,

- Files must be saved inside a website folder
- Images must be stored inside folders on the website

For the website you are going to make, you will need to set up a folder ready for you to put your pages. Do the following:

3a. Watch this video (approx. 10 minutes)

This video takes you through the process of creating the website folder with the correct subfolders.

Watch this video (5:38 to 7:07)

3b. Make a folder system (approx. 10 minutes)

Having watched the video, make your website folder with the following subfolders:

- css
- images
- pages
- videos

Task 4: Build a Basic Bootstrap Webpage (approx. 1 hour)

As you should have seen in Task 2, a webpage is a file made up of html code

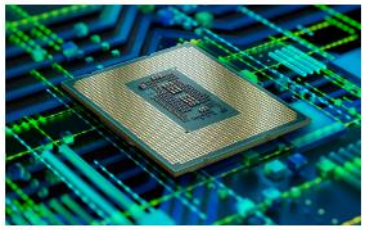
For the task you are going to make a basic Bootstrap webpage as a text file. This is the webpage that we will make:

An Introduction to Computers

Coding Block 1 Task

What is a Computer?

Do you know the different types of Computer? What can a Computer do?



What is a Processor?

Do you know the different types of Computer? What can a Computer do?

What are Input Devices?

Do you know the different types of Computer? What can a Computer do?

What are Output Devices?

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation

What is Computer Memory?

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation

What are Storage Devices?

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation

You will use some software to edit the website. This software is called Visual Studio and it can be downloaded from here: https://code.visualstudio.com/download

Once you have downloaded it, do the following:

4a. Install Visual Studio Code (10 minutes)

This should be a simple process.

1. Watch this video: https://code.visualstudio.com/learn/get-started/basics
2. Install and get familiar with VS Code
3. You may want to customise the interface so watch this video: https://code.visualstudio.com/learn/get-started/personalize

4b. Set up Visual Studio Code to use your folder system (10 minutes)

Now that you have set up Visual Studio, you now need to make it use the website folder that was created in Task 3b.

1. Watch this video (7:07 to 8:19)
2. Set up Visual Studio to work with your folder

4c. Learn about the Basic Bootstrap Page (10 minutes)

Now that you have set up the website folder, you now need to make a basic Bootstrap webpage.

1. Watch this video (8:19 to 15:10)

4d. Make the basic Bootstrap webpage

Having learned about the basic Bootstrap webpage, it's your turn to make it.

1. Make the basic Boostrap webpage
2. Save it into the root of your website folder and name it **index.html**

Task 5: Add Text and Styling to a Bootstrap Webpage (1 hour)

As you should have seen in Task 4, html code is made up of tags for different sections of the website that are given classes to make them use Bootstrap styling.

For this task you are going to change the way that **text** looks using Bootstrap styling of tags.

Do the following:

5a. Learn about text tags (10 minutes)

Do the following:

1. Watch this video (15:10 to 30:05)

5b. Learn about Bootstrap Styles (10 minutes)

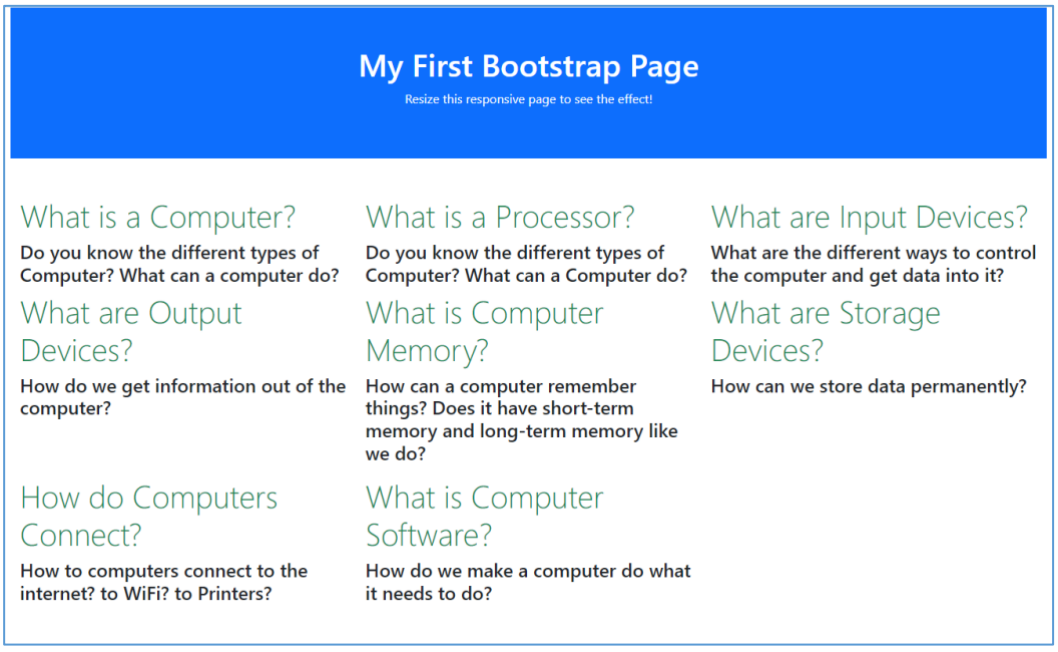
Do the following:

1. Watch this video (30:05 to 41:46)

5c. Add some basic styling to the Bootstrap webpage

Do the following:

1. Apply styling to the text tags in your **index.html** file so that it looks like this:



Task 6: Add Images to a Bootstrap Webpage (1 hour)

Remember, html code is made up of tags for different sections of the website and that includes images. Only text is used to place an image. However, the image must be present in your folder system.

For this task you are going to add images to your webpage using Bootstrap styling to make the image responsive. You should have been sent the images so please check your email. If you have not got them, please contact Jay using jpatel@dixons6a.com

Do the following:

6a. Learn about image tags (10 minutes)

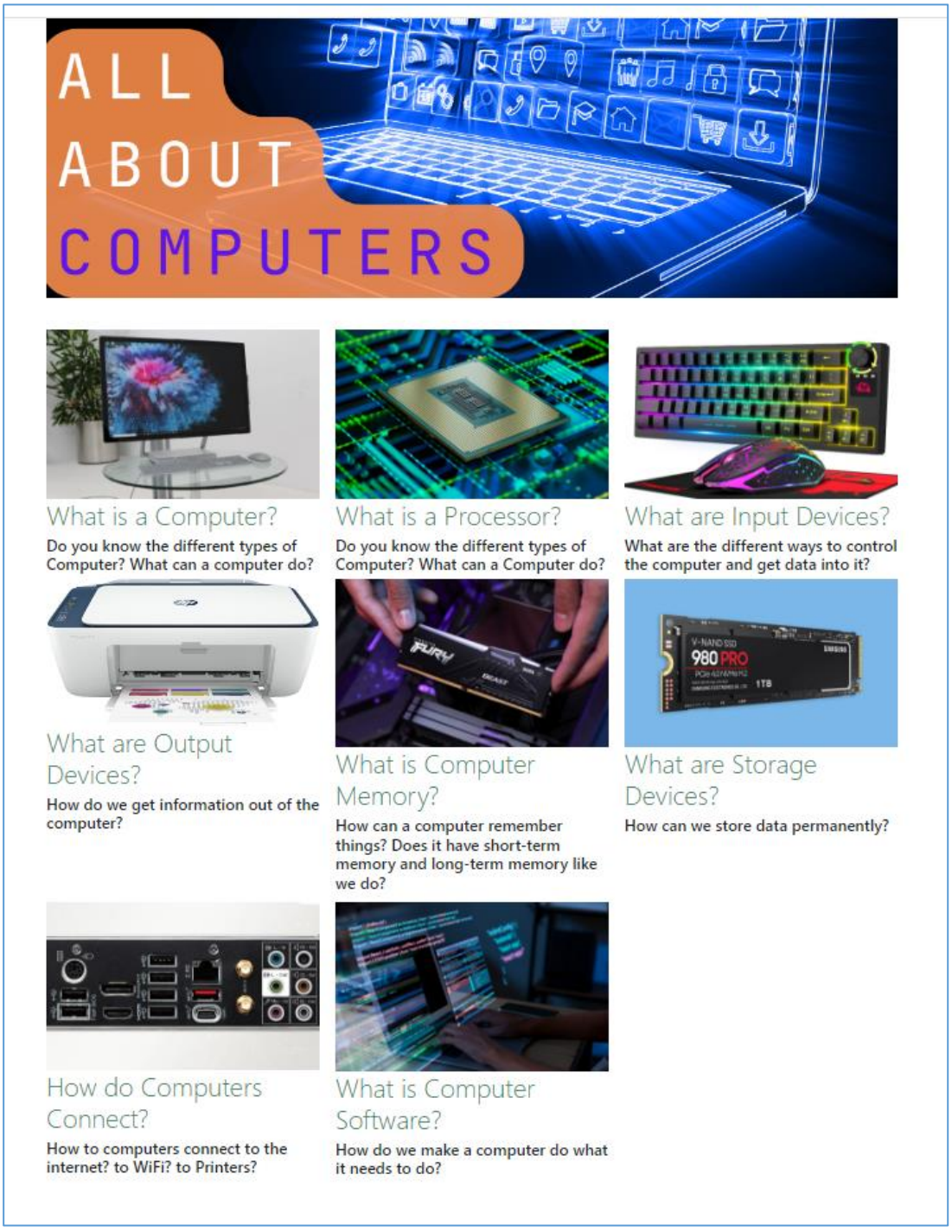
Do the following:

1. Watch this video (41:46 to 53:25)

6c. Add images to your Bootstrap webpage

Do the following:

1. Add images to your **index.html** file so that it looks like this:



Task 7: Add Video to a Bootstrap Webpage (1 hour)

Remember, html code is made up of tags for different sections of the website and that includes images. Only text is used to place an video. This time, the video can be present in your folder system or it can be stored on another website and then embedded into your website.

For this task you are going to add videos to your webpage using Bootstrap styling to make the video responsive.

Do the following:

7a. Learn about video tags (10 minutes)

Do the following:

1. Watch this video (53:25 to 57:47)

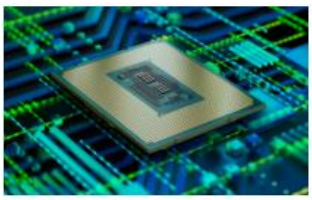
7b. Add videos to your Bootstrap webpage

Do the following:

1. Add videos to your **index.html** file so that it looks like this:

What is a Computer?

Do you know the different types of Computer? What can a computer do?



What is a Processor?

Do you know the different types of Computer? What can a Computer do?

What are Input Devices?

What are the different ways to control the computer and get data into it?

Task 8: Build Individual Webpages (3-4 hours)

Now it is your turn to make the pages.

You need to make individual pages based on your research.

Page1: What is a Computer? (approx. 30 mins)

Using your research and what you have learned from Tasks 2-7, do the following:

1. Make a new file for this webpage in the pages folder and name it **computer.html**
2. Build the page with the content from your research:
    a. you will need to decide how to lay out the page
    b. you will need to decide what images to add and where
    c. you will need to decide what videos to add and where

Page 2: What is a Processor? (approx. 30 mins)

1. Make a new file for this webpage in the pages folder and name it **processor.html**
2. Build the page with the content from your research:
    a. you will need to decide how to lay out the page
    b. you will need to decide what images to add and where
    c. you will need to decide what videos to add and where

Page 3: What are Input devices? (approx. 30 mins)

1. Make a new file for this webpage in the pages folder and name it **inputs.html**
2. Build the page with the content from your research:
    a. you will need to decide how to lay out the page
    b. you will need to decide what images to add and where
    c. you will need to decide what videos to add and where

Page 4: What are Output devices? (approx. 30 mins)

1. Make a new file for this webpage in the pages folder and name it **outputs.html**
2. Build the page with the content from your research:
    a. you will need to decide how to lay out the page
    b. you will need to decide what images to add and where
    c. you will need to decide what videos to add and where

Page 5: What is computer memory? (approx. 30 mins)

1. Make a new file for this webpage in the pages folder and name it **memory.html**
2. Build the page with the content from your research:
    a. you will need to decide how to lay out the page
    b. you will need to decide what images to add and where
    c. you will need to decide what videos to add and where

Page 6. What are Storage devices? (approx. 30 mins)

1. Make a new file for this webpage in the pages folder and name it **storage.html**
2. Build the page with the content from your research:
    a. you will need to decide how to lay out the page
    b. you will need to decide what images to add and where
    c. you will need to decide what videos to add and where
    d. save links to videos that you may like to include on your webpages

Page 7: How does a computer connect to the world? (approx. 30 mins)

1. Make a new file for this webpage in the pages folder and name it **connections.html**
2. Build the page with the content from your research:
    a. you will need to decide how to lay out the page
    b. you will need to decide what images to add and where
    c. you will need to decide what videos to add and where

Page 8: What is Software for a computer? (approx. 30 mins)

1. Make a new file for this webpage in the pages folder and name it **software.html**
2. Build the page with the content from your research:
    a. you will need to decide how to lay out the page
    b. you will need to decide what images to add and where
    c. you will need to decide what videos to add and where

Task 9: Add a Navigation Bar to a Bootstrap Webpage (approx. 1 hour)

Having built all of your pages, you now need to make connectione between them using a Menu of Navigation Bar.

Do the following:

9a. Learn about Bootstrap Navigation Bars (10 minutes)

Do the following:

1. Watch this video (57:47 to end)

9b. Add Navigation Bars to each of your Bootstrap webpages (30 minutes)

Do the following:

1. Add a Navigation Bar to your **index.html** file so that links to all pages
2. Add a Navigation Bar to your **computer.html** file so that links to all pages
3. Add a Navigation Bar to your **processor.html** file so that links to all pages
4. Add a Navigation Bar to your **inputs.html** file so that links to all pages
5. Add a Navigation Bar to your **outputs.html** file so that links to all pages
6. Add a Navigation Bar to your **memory.html** file so that links to all pages
7. Add a Navigation Bar to your **storage.html** file so that links to all pages
8. Add a Navigation Bar to your **connections.html** file so that links to all pages
9. Add a Navigation Bar to your **software.html** file so that links to all pages

9c. Zip (Compress) your Folder and Hand it in! (10 mins)

The last step is to hand in your work. Do the following:

1. Locate your website folder
2. Press and hold (or right-click) the file or folder, select (or point to) **Send to**, and then select Compressed (zipped) folder.
   A new zipped folder with the same name is created in the same location. To rename it, press and hold (or right-click) the folder, select Rename, and then type the new name.
3. Send the compressed (zipped) folder to jpatel@dixons6a.com by **Wednesday 22nd August 2024**

And Finally…

Well done!!!!

If you have any problems at any time, please contact Jay Patel on email using jpatel@dixons6a.com

Reading list

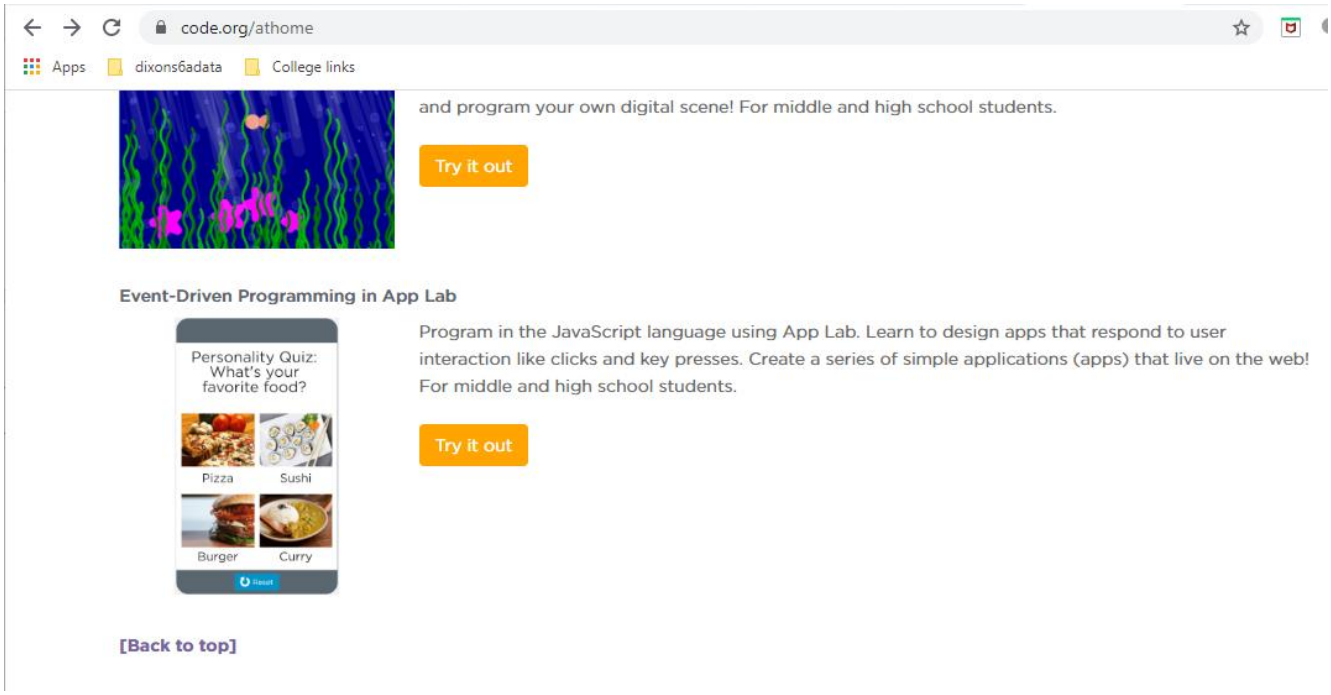
Further Reading and Tasks

One of the fundamental programming tasks that you will learn about in this course is that of Web Programming using JavaScript. In order to prepare for that you could do this course on Code.org.

You will need to sign up, watch videos and then complete the tasks.

Keep a record of what you do by taking screenshots of your work and compiling it on a MS WORD page.

Step 1: Go to Code.org and find the course (https://studio.code.org/s/csp5-virtual)



You need to choose Event Driven Programming in App Lab

Step 3: Sign up to the website

Step 4: Complete the Course

You will find videos, tasks and much more in here.