University of East Anglia
COMPUTING SCIENCES

Module: CMP-4011A Web-based Programming

Assignment: 002, 102, 201- Web Application Development

Set by: Dr Temi Alade (t.alade@uea.ac.uk)

Date set: 01 September 2025

Value: 60%/65%/100%

Date due: 09 December 2025 15:00 [week 12]

Demo date: **09 December 2025**

Returned by: 20 January 2026

Submission point: Blackboard

Checked by: Dr Riaz Ahmed Shaikh

Learning outcomes

This assignment is designed for students to demonstrate they have achieved the following learning outcomes:

- Design
  - Write and apply HTML mark-up appropriately.
  - Create CSS rules and apply to HTML documents efficiently.
- Usability
  - Present web content appropriately.
  - Write JavaScript code to handle DOM events and allow user interactions.
- Server programming
  - Write server-side JavaScript code using the NodeJS runtime environment to handle client requests.
  - Apply Express routing for server tasks.
- Web security
  - Implement features to address web security.

Specification

Overview

This is a **team-based** assignment. The objective of this assignment is to *design* and *develop* a website using the following web technologies: HTML, CSS, JavaScript, as well as NodeJS, the JavaScript run time environment, for backend processing. You will be working in a team of three or four members. Trello, an online project management system, will be used to document your project work. The completed website (i.e. the frontend and backend code in a zip file) must be submitted to Blackboard on or before the due date. This assignment will be assessed via a compulsory demo session, to be scheduled in week 12 (date/time will be advised in due course).

Background

Sustainability[1] is the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs. It is a complex issue that encompasses a wide range of areas, including climate change, poverty, inequality, and environmental degradation.

Some of the most pressing sustainability issues facing the world today include:

- Climate change[2]: The Earth's climate is changing at an unprecedented rate due in large part to human activities. This is causing a range of problems, including rising sea levels, more extreme weather events, and changes in agricultural yields.
- Poverty: Millions of people around the world live in poverty, without access to basic necessities such as food, water, shelter, and healthcare. This is a major barrier to sustainable development.
- Inequality: The gap between the rich and the poor is growing wider, both within and between countries. This is also a major challenge to sustainable development.
- Environmental degradation: The Earth's natural resources are being depleted at an alarming rate. This is leading to problems such as deforestation, soil erosion, and water pollution.

To combat against climate change, the UN has called for more sustainable practices in using the earth's natural resources. It has established seventeen Sustainable Development Goals[3] designed to improve the lives of populations around the world and mitigate the hazardous man-made effects of climate change.

Your team has been asked to assist a local Sustainability Advisory Committee (SAC) [an imaginary group] to **design** and **develop** a website that can present key information about UN Sustainable Development Goals for their local policy makers.

Your website can contain videos and/or audio although it is not a requirement.

Your website must provide a means for visitors to sign up and receive regular newsletters. Visitors' details such as first name, last name, email address and comments must be collected and stored for later use. Additional information such as interests or other personal details may be collected if appropriate. Considerations for GDPR and its implications will not be assessed and therefore can be omitted in this assignment.

To help you get started, you can find the information about the UN's Sustainable Development Goals on this web link:
https://www.un.org/sustainabledevelopment/sustainable-development-goals/

[1] UN sustainability - https://www.un.org/en/academic-impact/sustainability
[2] UN climate change: https://www.un.org/en/climatechange/what-is-climate-change
[3] UN Sustainable Development Goals: https://www.un.org/sustainabledevelopment/sustainable-developmentgoals/

The task for your team is to **select three** (from the total of seventeen) UN's Sustainable Development Goals to be the focus of the website you and your team will design and develop.
Feel free to use the text, images, graphics, or diagrams that link to the goals you have selected on your website however, your website design cannot be identical or look similar to the UN website. Also, don't forget, your target audience is local policy makers.

NOTE: You will not be assessed on the amount of information being presented (i.e., the level of details or accuracy). However, you will be assessed on your web design (accessibility and usability), for example how the content is being organised and presented on the webpage. Remember, this is a web programming assignment rather than a web editorial assignment. How the text is organised and displayed is more important than the level of details being presented.

Specifications:

The website **must** include the following pages:

- Home page (named as "index.html").
- A page for displaying team information (i.e., your team members), including names, short bio, role in this project, responsibility, and contributions (see Table 1 below as an example).
- A signup form where users can use to register for receiving newsletters. The signup form **must** contain at least four fields: first name, last name, email address and comments. You can add more fields if you wish. Form data handling (e.g., form validation) is necessary for this assignment. After the form is submitted, the user should be presented with a message confirming their submission – indicating a successful or unsuccessful submission. A signup confirmation email might be sent to users after submission.
- At least one page (and up to a maximum of three pages) for presenting UN Sustainable Development Goals you have selected.
- **The content of the web site must not be hard-coded, but instead, it must be written in JSON** (see Frontend minimum requirements section below for more details).
- JavaScript code should be written so that the content of each web page can be dynamically loaded when the page loads on a browser, for example using fetch API.
  NOTE: You will be penalised if the content is hardcoded on the HTML page.

You can include any other pages where appropriate. However, your website must not go beyond 8 pages.

Frontend minimum requirements:

The use of HTML markup for all web pages:

- HTML semantic mark-up should be used on all web pages, e.g., don't use `<div>` for every single element on your page.
- No deprecated tags.
- All HTML documents should be validated.
- The webpage can contain HTML tags but the content (those can be viewed on a browser) **must **NOT** be hardcoded**. You must load the content dynamically using JavaScript.

The use of CSS3 for all web pages:

- Should be implemented in an external file. **NOTE**: You will be penalised if inline or embedded CSS is used.
- Use class and id attributes.
- Appropriate colour scheme should be used.
- **Do not** use SASS or compiled CSS/HTML
- All CSS files should be validated.

The use of JavaScript for all web pages:

- Should be implemented in an external file. **NOTE**: You will be penalised if embedded JavaScript code is used.
- At least one *fetch* function should be implemented (e.g., to load the web content and/or submit the form data).
- You **must not** use jQuery library.
- You **should not** use any frontend frameworks, such as React, Angular etc.

Backend minimum requirements:

The backend server ****must**** be implemented in NodeJS, a JavaScript run time environment.

The server can be run on a local machine and be accessed via localhost (e.g., on port 3000 although you can use a different port if you wish).

The *minimum requirements* of the Web server are:

- Use Express framework.
- HTTP methods should be used in ways that are compatible with the method definition. For example:
  - Use GET for retrieving data. **Do not** write data in a GET handler.
  - Use POST for saving data. **Do not** use POST to display a page.
- **Do not** use query parameters with POST.
- Should serve static files.
- Form handling:
  - Should be able to receive the client form data with no errors.

- The data should be stored on the local file system (i.e., on the local server) in JSON format.
- Acknowledgment of receipt should be sent back to the client/frontend and be rendered on a webpage (i.e., acknowledging whether or not the data has been successfully received).

Desirable Requirements:

Extra marks will be awarded for:

- The use of dynamic web template:
  - rendering using a web template such as *EJS or Pug*. Note that the use of *ejs* or *pug* is not covered in the lectures. You will need to refer to online documentation to learn how to use it – a useful skill in programming!
- Sending email to the user after they submit the form, to confirm successful sign-up.

Documentation:

- You should provide a brief site guide (maximum one side of A4) describing how to use your website. This is an opportunity to highlight any special features you have incorporated on the website. The guide could be as succinct using a paragraph or two and a bullet point list. This is also an opportunity to comment on the division of the work between you and your team members.
- Weekly progress should be documented using Trello project management system.

Beyond this specification all other design decisions are your own – and marks will be awarded accordingly. For example, you may wish to consider what data entry checks (validation) should be made, also other issues such as usability, accessibility, UI interactions etc.

All web pages should be optimised for the computer lab screens.

If you develop the website on a laptop, be sure to check that they still display adequately on higher-resolution screens.

Team

This is *team-based* assignment. Each team is made up of **three or four** members.

Teamwork is one of the most efficient ways to solve problems and tackle big tasks in any environment and often the experience is highly rewarding. However, teamwork can also lead to unsuccessful outcomes, particularly when there are problems within the team. Typical problems that can arise include one person contributing more than others, or a lack of guidance, or a clash of personalities. To avoid the potential problems, we recommend that once you know your team, explore strengths of each person, and allocate tasks accordingly. Remember it is up to the team to decide the roles for their members as well as what their tasks are. Do watch out for the workload though, it should be evenly dispersed between all members.

Each team should have a team leader or coordinator. This role can be taken by one person throughout the assignment or people can take turns. To make the most out of this experience, each person should have a defined role with their own responsibilities. By way of an example of allocating

tasks and responsibilities, Table 1 shows an example of tasks associated with this assignment. I would suggest each member would take responsibility of at least one task as their contributions.

Table 1: Assignment tasks example, which shows clearly what task each team member is responsible for.

	Task	Who/Name
index.html	CSS, HTML, fetch call, JSON, node/express	
goal-x.html	CSS, HTML, fetch call, JSON, node/express	
teams.html	CSS, HTML, fetch call, JSON, node/express	
form.html	CSS, HTML, fetch call, JSON, node/express	
Putting everything together	CSS, HTML, fetch call, JSON, node/express	
Documentation (Trello and Blackboard submission)		

Trello online project documentation system

Each team should record their work (such as design process and tasks progression) in Trello. Trello is an easy-to-use online project management system. All you need to do is to sign up, if you have not already done so, or sign in, create a new project (called board) name it as "Group X – 2025-26 CMP-4011A Assignment" (where X is your group ID), and invite your team members to the project. Make sure to invite me - Dr Temi Alade (email: T.Alade@uea.ac.uk), and Dr Riaz Shaikh (email: riaz-ahmed.shaikh@uea.ac.uk) to your project area.

Note: You may be penalised if we cannot review your Trello project in a timely manner due to missing invites or permissions.

Sketches/diagrams/pictures and notes of this assignment should be uploaded to Trello, as well as a list of each individual's tasks.

Where there is an ambiguity in the specification/requirement above, you should record this in Trello along with any decisions and justifications you have taken in response.

Trello URL: https://trello.com. It is anticipated that each team will have an account opened with Trello. A Trello tutorial guide will be provided for you on Blackboard.

Relationship to formative assessment

The assignment is based on weekly lab exercises you have carried out.

Deliverables

- Stage 1 – Project review on the design of the website and Team management
  - When and where: Week 6 – **28 October** (exact timeslot and room to be confirmed in due course)
  - A 5-minute presentation to be presented plus 5-minute for Q&A.
- Stage 2 - Electronic submission
  - When: **Tuesday 09** December 2025, time: 15:00
  - Where: Blackboard submission point
  - What to submit?
    - **Everyone**: Lab sign-off sheet (see Professionalism section below). Everyone should submit their lab sign-off sheet individually.
    - **Group**: A zip archive containing all files (HTML, CSS, JavaScript including Node JS, any images, and a single PDF site guide) **must be submitted by each group (i.e., one submission per group)**.
      - Make sure links are relative for the website to be portable.
      - The web link to your Trello should be included in the site guide.
      - The single site guide is not assessed but does help the marker to understand the website and to be aware of any additional features you may have implemented.
    - The zip file should be named as: `group_<ID>_wbp.zip` (where <ID> is your group ID, which is assigned at the beginning of the term).
    - Archive formats other than zip will not be accepted. **Note:** you may be penalised if your archive format is not zip (e.g. .rar).

NOTE: Your team may be penalised if the work is submitted late. Failure to submit on time may deny you (as a team) the chance of participating in the compulsory demo session.

- Stage 3 - Compulsory demonstration.
  - When: week 12, Tuesday, 09 December
  - Time allowed: 10 minutes plus 5 minutes Q&A (exact timeslot to be advised)
  - The demonstration should include the core features of your website and highlight any additional features you may have implemented. **Everyone will have a chance to talk about their part of the work**. You may be questioned on your code or asked to show the code validation.
  - **NOTE: Failure to participate the compulsory demonstration will result in a mark of zero being awarded to the absent person**.

- The assessment of Trello online project management system
  - When: week 12, Tuesday, 09 December
  - The marker will assess how well the project is documented using the online Trello system. Dr Temi Alade (email: T.Alade@uea.ac.uk) and Dr Riaz Shaikh (email: riaz-ahmed.shaikh@uea.ac.uk) must be invited to your Trello system. It is your responsibility to ensure both Dr Temi Alade and Dr Riaz Shaikh are successfully invited to your Trello project area.

Important Notes

The assignment is a team-based project, reflecting on typical projects carried out in an industry environment.

Every team will receive a group mark for their project. However, individual team members will receive their mark, which is calculated using the formula: group mark * ratio, where the ratio is determined by the individual's engagement and contributions to the project rated by their own team members. Each team member will have an opportunity to comment on their peers' contribution via an online voting system. The vote will contribute to how the ratio is calculated. Additional weight will be awarded to any member of the team who acted as a buddy and guided their team member or members to successfully completed this project.

The online voting system **will be opened in week 12 for a limited time only**, so please stay tuned!

WARNING: Failure to participate in this voting system may result in the ratio being capped at 50% for that person.

Be sure to document the design and development processes, and tasks assigned to each member of the team in Trello. Each member is encouraged to actively engage with this documenting process (i.e. documenting their own tasks and progress on Trello). Remember the success of the project is the success of the team!

It is anticipated that everyone in the team will work collaboratively and cooperatively in this project. Any disputes should be dealt with by discussing with their own team members in the first instance. If that fails to resolve the issue, then raise it with Temi Alade or Dr Riaz Shaikh as soon as possible. The sooner you contact us, and the more information you provide will help us resolve the issue quicker for you.

Professionalism

Professionalism refers to the qualities that relate to skilled individuals and it should be at the heart of everything we do. These qualities include (not limited to) organisation, commitment, reliability, time management, and most importantly, showing that we care about our work.

For this assignment, we will assess your professionalism in learning through your engagement of weekly lab activities throughout the semester. This means, you are required to complete **eight** lab exercises and get a lab tutor to sign off your work.

How does this work?

- Download the labs sign-off sheet from BlackBoard in week 1 and produce a printed copy.
- Bring this printed copy to the lab every week.

- When you complete your lab exercise (every week), show your code and outputs to a lab tutor for sign off. **Note:** You are **NOT** allowed to email a lab tutor with your work for sign off. You can only ask a lab tutor to sign off your work *during* your scheduled lab session.
- Your lab tutor will check your work, and subject to their satisfaction, they will put their signature on your labs sign-off sheet.
- Submit your labs sign-off sheet to BlackBoard submission point on or before 09 December 2025, 15:00, see the "Deliverables" section above.

Mark is awarded according to the information on the sign-off sheet that we received. It is **your responsibility** for safe-keeping your labs sign-off sheet as we will not keep a record for you. Be aware that your lab tutor will not be happy to sign off multiple labs in one go, so make sure that you manage your time well. In addition, they can refuse to sign off any labs at a last-minute request (imagine everybody was asking a lab tutor to sign off their labs in week 10!). Therefore, it is your responsibility to manage your time and bear in mind that it takes time for a lab tutor to check your work.

Resources

Lecture notes and lab exercises from the module will be helpful in completing this assignment.

Stack Overflow is a valuable resource, but **you must not post questions there (or on any other similar forum) asking for help with this assignment**.

https://developer.mozilla.org/en-US/ is a valuable reference point.

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Marking Scheme and Rubric:
Group Project Mark:

	Weight	Score
Stage 1 – Design & Team management	30	
Stage 2 - Demonstration	70	
Total:	100	

Stage 1: Project Review Marking Rubric

Simplicity In terms of Web design, simplicity refers to an approach to express something in a complete and efficient way.	10%
Navigation Is your website easy to navigate forwards and backwards, with working links?	10%
Theme and Consistency Does your project have a consistent font, colour, and style theme?	10%
Creativity and Design Does your project show originality and good overall design?	10%
Teamwork & Participation	60%

Stage 2: Project Review Marking Rubric

Quality of the overall website, based on "look and feel" and functionality, e.g. visual hierarchy and flow, ease of navigation, colour scheme, ability to resize sensibly, form functionality, accessibility, dynamic content, JSON, HTTP routing, form validation and sanitisation. Web UI quality - 15% Fetch and JSON – 15% Node and Express - 15%	45%
Additional marks will be awarded for other features you have researched yourselves that effectively enhanced the usability/performance of the website.	20%
Quality of coding (HTML, CSS, and JavaScript)	15%
Answers to questions and the demonstration of student's wider understanding	10%
Documentation – Trello and Blackboard submission	10%

Individual Mark:

Group mark		
Peer and academic adjustment		
	Weight	**Mark**
Individual project mark after adjustment	80	
Professionalism (labs sign-off sheet)	20	
Provisional final mark	100	
Comments:		