Assignment Brief	
DC1IAP Internet Applications	*"Healthy-Life"* **Software Product (HLSP)**
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Assignment brief:

Healthy-Life is a software product meant to help users manage their wellbeing. In order to successfully complete this assessment, you will produce the following deliverables:

- The client and server sides of an **application** that can be supported by different browsers and devices (e.g., smartphones).
- A **report** to explain your design decisions and provide critical analysis of your software implementation.
- A **presentation**[1] of your final software implementation.

You will be aiming to demonstrate your capability to achieve the following learning outcomes of DC1IAP:

1. Design and implement well-presented dynamic web pages (using HTML, CSS and JavaScript) as well as web services and applications (using server-side scripting languages), making use of appropriate software tools.
2. Make use of modern client-side libraries and frameworks to enhance the interactivity and usability of web sites.
3. Explain the key security risks which should be considered when writing the client and server-side of a web application as well as write secure client-side code to consume RESTful APIs and server-side code which is secure against common attacks.
4. Explain the difference between, and the implications of using, procedural and event-driven programming, as well as dynamically and statically typed languages.

To get started, consider the description of the *Healthy-Life* software product (HLSP) given in the remainder of this paragraph. The users input their daily routines into the HLSP, i.e., they record details about their meals, exercise, work and sleep patterns, etc. If they so choose, the users can also collect some of their data (e.g., step count) by importing readings from a third-party solution, such as a mobile app. Based on these datasets, the HLSP will suggest resources relevant to the users' lifestyle choices. The recommendations may range from scientific articles on healthy eating or achieving a restful sleep to deals at the local gym and news items on how to include more exercise in the busy life of the modern-day professional. Very importantly, all

[1] The presentation will be a video recording submitted after your third coursework submission point (22/01/2023)

resources recommended by the HLSP have to be reliable, i.e., published by trustworthy sources, such as https://www.nhs.uk, https://www.who.int, https://www.bbc.co.uk, etc. As the users build a more elaborate profile, the HLSP's recommendations become more meaningful, however, **the HLSP must NOT provide advice on how to treat medical conditions of any kind (including mental health)**.

Descriptive details of assignment:

The assignment consists of your **individual work** (1) implementing the HLSP, (2) documenting it in a written report, and (3) presenting it in a video recording. Begin by understanding the HLSP description given in the Assignment brief section. **Refine, expand and/or adjust** the product description to reflect your understanding and expectations of the HLSP scope and feature set.

Look for similar web apps promoting fitness and well-being, in order to become familiar with the relevant state of the art. This will inform the development of your own app.

The **HLSP description provided** in the previous section needs to be expanded and refined into a fully developed specification. Although you are expected to conduct research on similar applications available online in order to extract insights helpful to your own work, you are not required to match the functionality of commercial software (e.g., implementing an AI-powered recommendation system that identifies and suggests resources based on the end user's profile is outside the scope of this module).

To support the production of your refined HLSP description, apart from conducting research on similar solutions, consider user scenarios (https://www.getfeedback.com/resources/ux/how-user-scenarios-help-to-improve-your-ux/) in order to improve the HLSP's UX (i.e., **implement** features that will attract users, making it more likely for them to choose your product over competing software.

Create **different user scenarios** representative of your product's target audience, e.g., common users, administrators, people of different ages and genders, with or without disabilities will typically interact with the software in different ways.

Once you have settled on a final version of the HLSP description, continue to the following:

1. **Client-side perspective.**

   1.1. Unit 1. HTML5.

   a) Practical element. A website implementation based on HTML pages.

   b) Report element. Complete the report sections relevant to the following:

      - An updated version of the **HLSP description**.

- What is the recommended HTML page **structure/content** for the HLSP? (Content refers to media, images, links to the webpage, etc.).

  Note: Justify the chosen HSLP structure and explain the purpose and value of each content element, making clear connections with the HLSP. You may find it useful to include user scenarios[2] and related approaches.

- Describe the main tags and attributes that you used to support your recommended structure/content.

1.2 Unit 2. CSS.

a) Practical element. A more elaborate website implementation based on HTML pages and CSS.

b) Report element. Consider answering the following questions:
   - What features of a well-designed web page have you applied to the HLSP?
   - In what parts of the HLSP have you applied CSS?
   - How did CSS support the HTML structure and the HSLP elements' positions?
   - Have you applied style rules to the HLSP?
   - What tools have you used to verify that your CSS is correct?
   - Which **platform(s)** does your web implementation support?
   - How do you provide support for different screen widths?
   - What **front-end framework(s)** (e.g., bootstrap) are you using, if any?

1.3 Unit 3. JavaScript.

a) Practical element. A more elaborate website implementation based on HTML pages, CSS, and JavaScript.

b) Report element. Consider answering the following questions:

   - How do you propose the user would interact with the HLSP using JavaScript?
   - During your implementation, what advantages/disadvantages have you found regarding the **dynamically typed** characteristic of JavaScript?
   - What elements of the Document Object Model (DOM) have you used to read and modify your HTML pages in the HLSP?

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[2] User scenarios https://www.getfeedback.com/resources/ux/how-user-scenarios-help-to-improve-your-ux/
A closer look at Personas: What They Are and How They Work
https://www.smashingmagazine.com/2014/08/a-closer-look-at-personas-part-1/
How to write user stories, epics and personas https://www.youtube.com/watch?v=Fw98L-kcRpc

- What tool(s) have you used to fix errors in your JavaScript code?
- Where did you use **Event Driven Programming** to trigger JavaScript dynamically in the HLSP?

2. Server-side perspective.

2.1 Unit 4. Node.js.

a) Practical element. A more elaborate website implementation with client and server-side components:
   - Client side: HTML pages, CSS, and JavaScript.
   - Server side: Node.js and basic database functionality.

b) Report element. Consider answering the following questions:
   - What is your proposal to use the Node.js execution environment as a Web Server?
   - What features/services will be provided by the server?
   - What are the advantages/disadvantages of using Express as a Web Application Server to build web applications and services in Node.js?
   - What database (e.g., MongoDB, MySQL, Oracle) have you selected to achieve data persistency in the HLSP?
   - What are the advantages/disadvantages of your selected database to offer data persistence in the HLSP?

3. Unit 5. Web Application Security.

a) Practical element. A more elaborate website implementation that, in addition to the functionality of the previous version, also features at least one security mechanism for each of the server-side and the client-side perspectives.

b) Report element. Consider answering the following questions:
- Which security issues are you considering on the client side?
- Which security issues are you considering on the server side?
- What authentication strategy have you implemented on the server?

4. Unit 6. Frameworks and Architecture.

a) Practical element. No further implementation is required.

b) Report element. Consider answering the following questions:
   - How did you would implement the **DRY principle** in the HLSP?
   - How did you would overcome the STATE problem in the HLSP?

- How did you would architect the separation of concerns (e.g., Domain Model vs Presentation)?

Note: In all cases, **justify and contextualize your decisions/answers**, i.e., explain the rationale behind your choices within the specific context of the HLSP.

Further details - Report element:

1. **Report element structure:** The report should comply with standard academic report requirements. The structure recommended below need not be followed to the letter yet can be used as a suitable starting point.

   - **Introduction.** Include the refined HLSP description, i.e., the one you produced as a prelude to the HLSP implementation.

   - **Software Product Implementation.** Organise this section in accordance with the steps you completed whilst working through the practical element of the coursework. Each subsection should contain the relevant output and a succinct, to the point critical reflection on how it was obtained; however, you can provide additional information in the report Appendices.

     Note: The report sections are determined by the information provided in Descriptive details of assignment, subsections 1.1, 1.2, 1.3, 2.1, 3, and 4. Answers to the proposed questions in each subsection should be provided, as a minimum.

   - **Conclusion.** A critical reflection on your implementation (e.g., things that went well, things that can be improved, technical limitations/issues, etc.). Also address any shortcomings in your implemented solution, lessons learnt and suggested future work.

   - **References** (not counted within the 2000-word limit).

   - **Appendices**. Include all additional information relevant to the software implementation here and other details pertinent to your report. For example, you can highlight some specific techniques used during the implementation in the form of text, screenshots/figures within the main body of the report, and link to the appendix section where further details are available (not counted within the 2000-word limit).

2. **Formatting guidelines:**
   - Recommended length for the final submission: 2000 words +/- 10%, excluding figures, text embedded in figure elements and captions, title page, references, and appendices. Do not exceed 2200 words, as any content beyond that limit will not be marked. Include your full name on the cover page.
   - Please state the **word count** (that is, excluding appendices and references) on the front page of your report.
   - Document Title must preferably be named DC1IAP_Lastname_Firstname_Report
   - Font: use one of the common typefaces, 11 or 12 pt., single spaced.

- Page: A4, portrait.
- Referencing: Harvard, APA or IEEE.
- Document: PDF or MS Word.

Further details: Practical element:

Your web application must meet, as a minimum, a set of **core goals**:

- Directly implement functionality relevant to the HLSP (Units 1 and 2).
- Have a consistent, clean design (Units 1 and 2).
- Incorporate client-side form validation (Units 3 and 4).
- Include server-side functionality, written in Node.js (Units 3 and 4).
- Use AJAX to communicate between at least one webpage and the running server (Units 3 and 4).
- Implement at least one example of data persistence in a Node.js server (Units 3 and 4).
- Implement (i) one strategy to overcome security issues on the server-side and (ii) one strategy to overcome security issues on the client-side (Unit 5).

To gain higher marks, you should also aim to meet some **stretch goals**:

- Non-trivial interactivity with users.
- Enriched problem scope (rich feature set)
- Attractive, responsive design.
- **Extended** server-side functionality.
- Thorough automated testing of your server-side code.
- **Extended** data-persistency functionality.
- Other relevant goals that you define for yourselves.

If you choose to extend the app's server-side or data-persistency functionality, you may either conduct further research on an approach, technique, tool or technology that was explored in the module, or consider a new one (that is nonetheless related to the ones covered within the taught content).

You can also define your own stretch goals. All self-defined stretch goals should:

- **Be of appropriate scope.** The work necessary to complete them to a high standard should be commensurate with the allocated marks (i.e., each stretch goal will require approximately 10% of your effort devoted to one specific coursework submission). Note that it is possible to achieve this by having a single large stretch goal or several smaller stretch goals.

- **Contribute to your application's purpose.** Your stretch goals should be well integrated and relate clearly to the web application (or its promotion) rather than being incidental to it.

- **Show originality.** Your stretch goals should involve original thinking, either in using a technology discussed in the module in a way or to a depth **not covered in the**

module material; or by **researching and using an appropriate technology** (e.g., library or framework) not covered in the module.

The marks for stretch goals of less than expected scope, contribution or originality will be scaled down accordingly.

Presentation:

For the final presentation (22/01/2023), you will need to submit a **video recording**, lasting no more than 10 minutes.

Final remarks:

You will complete the practical element of the coursework and write the accompanying report gradually, in manageable increments, throughout the duration of the module. **Each incremental coursework submission will be marked.** The marks obtained on a given submission point are final (you will not be allowed to resubmit revised work against a submission point if the relevant deadline has lapsed), however, you may and are encouraged to reflect on the tutor's feedback in order to improve future work.

Recommended reading/ online sources:

- The core and further reading section of the module's units will provide you with a foundation on which you can build your practical work and report.
- Support Videos for quick recap of each unit's content available under respective units on Blackboard.
- Webinar materials for respective units presented on Blackboard (including webinar notes).

Key dates summary:

These are the key dates surrounding the assessment:

Date	Milestone	Weight
15 Sep 2022	**Coursework set**	
30 Oct 2022	Coursework: **submission 01** Report and practical elements (module Units 1 and 2)	15%
04 Dec 2022	Coursework: **submission 02** Report and practical elements (module Units 3 and 4)	25%
22 Jan 2023	Coursework: **submission 03** Report and practical elements (module Units 5 and 6)	35%
22 Jan 2023	**Presentation submission** Video recording	25%
	Total:	100%

Details on Key dates and required activities:

15 Sep 2022	**Coursework set**
19 Sep – 02 Oct 2022	**Independent work.** *Descriptive details of assignment.* Items 1.1. a) and 1.1. b).
	Support and feedback. Available throughout webinars and, on-demand, during tutors' office hours.
03 Oct – 16 Oct 2022	**Independent individual work.** *Descriptive details of assignment.* Items 1.2. a) and 1.2. b).
	Support and feedback. Available throughout webinars and, on-demand, during tutors' office hours.
17 Oct – 30 Oct 2022	**Coursework: submission 01** – Sunday, 30/10/2022 @ 23:59
	Independent work. *Descriptive details of assignment.* Items 1.3. a) and 1.3. b).
	Support and feedback. Available throughout webinars and, on-demand, during tutors' office hours.
31 Oct – 13 Nov 2022	**Independent work.** *Descriptive details of assignment.* Items 2.1. a) and 2.1. b).
	Support and feedback. Available throughout webinars and, on-demand, during tutors' office hours.
14 Nov - 20 Nov 2022	**Independent group work.** *Descriptive details of assignment.* Items 1.3. a), 2.1. a), 1.3. b) and 2.1. b).
	Support and feedback. Available throughout "**on-campus**" sessions.
21 Nov – 04 Dec 2022	**Coursework: submission 02** – Sunday, 04/12/2022 @ 23:59
	Independent work. *Descriptive details of assignment.* Items 3. a) and 3. b).
	Support and feedback. Available throughout webinars and, on-demand, during tutors' office hours.
05 Dec - 11 Dec 2022	**Independent group work.** *Descriptive details of assignment.* Items 4. a) and 4. b).
	Support and feedback. Available throughout webinars and, on-demand, during tutors' office hours.
02 Jan – 22 Jan 2023	**Independent work***. Descriptive details of assignment.* Items 3. a), 4. a), 3. b) and 4. b).
	Support and feedback. Available throughout webinars and, on-demand, during tutors' office hours.
	Coursework: submission 03 – Sunday, 22/01/2023 @ 23:59 **Presentation submission:** – Sunday, 22/01/2023 @ 23:59

22 Feb 2023	Expected feedback return date (on Blackboard).

Submission details:

- A link will be provided in the Assessment Submission section on Blackboard for each one of the **THREE** coursework submission dates (the submission links will be made available in due course).
- Only a single file must be submitted; it should contain the report element (pdf or MS Word file), the practical element (source code) and the presentation (video recording). (*)
- Regarding the practical element and the presentation, an alternative is to provide a **link to a repository** to download them.

(*) The presentation is only required for the third submission.

Marking rubric:

The marking rubric below fully applies to the three coursework submissions with the following caveat: for the case of **submission 01** (30/10/2022) and **submission 02** (04/12/2022), only the elements corresponding to the *current progress on the module Units* will be evaluated.

1. **Report element**

Up to 40	The product description provided in the coursework brief has been insufficiently refined or not at all. There is little evidence that the proposed questions for each module Unit (See Descriptive details of assignment) have been appropriately addressed, there is limited explanation of why design decisions, techniques and specific strategies have been selected/implemented in relation to the HLSP. The proposed structure and content of the HLSP is incomplete, inconsistent and/or partially incorrect. Overall, the narrative is mostly descriptive, with few or no elements of critical analysis. The conclusion section is absent or lacks the appropriate depth. The writing has major defects: regular errors of English, substantial repetition and/or irrelevance, significant gaps in the account leading to unconvincing arguments, poor structure and a standard of presentation (e.g., layout, fonts, headings, figures) so poor as to actively detract from understanding the message being conveyed.
41 - 49	The product description provided in the coursework brief has been refined to a limited extent. Some of the proposed questions for each module Unit (See Descriptive details of assignment) have been correctly addressed. Some elements of proposed structure and content of the HLSP are of appropriate scope and quality, however, the overall proposal is still incomplete and inconsistent. In general, the narrative is mostly descriptive, with only some elements of critical analysis. There is an attempt at reflecting on the justification of design decisions, techniques and implemented strategies, yet the conclusions being drawn fail to coalesce into a meaningful take-away message. The writing has some defects that do not detract from understanding the message being conveyed.

50 – 59	The product description provided in the coursework brief has been adequately refined. The essential proposed questions for each module Unit (See Descriptive details of assignment) have been addressed in a satisfactory fashion. Most of the elements of proposed structure and content of the HLSP are of appropriate scope and quality, coming together to form a coherent design of the HLSP, albeit with significant inconsistencies. There is a good balance between the descriptive and the analytical/reflective elements of the narrative. The conclusion section is meaningful. The report is clearly structured and makes effective use of figures and other supporting artefacts. The writing defects are minor.
60 – 69	The product description provided in the coursework brief has been adequately refined. Most proposed questions for each module Unit (See Descriptive details of assignment) have been correctly addressed. All elements of proposed structure and content of the HLSP are of appropriate scope and quality, coming together to form a coherent design of the HLSP, albeit with some inconsistencies. There is a good balance between the descriptive and the analytical/reflective elements of the narrative. The conclusion section is meaningful. The report is clearly structured and makes effective use of figures, tables and other supporting artefacts. The writing defects are minor.
70 – 79	The product description provided in the coursework brief has been thoroughly refined, with evidence of critical insight. All proposed questions for each module Unit (See Descriptive details of assignment) have been correctly addressed. All elements of proposed structure and content of the HLSP are of appropriate scope and quality, coming together to form a coherent design of the HLSP, completely free of inconsistencies. There is a good balance between the descriptive and the analytical/reflective elements of the narrative. The conclusion section is particularly insightful. The report is structured in a highly intuitive manner and makes effective use of figures, tables and other supporting artefacts. There are no writing defects.
80 – 100	The product description provided in the coursework brief has been thoroughly refined, with substantial evidence of critical insight. All proposed questions for each module Unit (See Descriptive details of assignment) have been correctly addressed at a professional standard. All elements of proposed structure and content of the HLSP are of appropriate scope and quality, coming together to form a coherent design of the HLSP, completely free of inconsistencies. The conclusion section is particularly insightful, with important elements of innovation. The report is structured in a highly intuitive manner and makes excellent use of diagrams and other supporting artefacts. There are no writing defects.

2. **Practical element** (web application implementation)

Up to 49	Core goals implementation (*). Full marks will be allocated if you **fully meet** the core goals. Half marks may be allocated for functionality which partially meets a goal. Marks will **not be allocated** for functionality which simply duplicates examples seen in the module (e.g., attribute-based form validation alone, or the JavaScript password checker in Unit 3).
50 - 59	Core goals implementation + 1 stretch goal (*).
60 - 69	Core goals implementation + 2 stretch goals (*).
70 - 79	Core goals implementation + 3 stretch goals (*).
80 - 100	Core goals implementation + 4 or more stretch goals (*).

(*) See Further details: Practical element.

3. **Final presentation** (video recording)

Up to 49	The presentation involves a description of the system, but no relevant refinement over the initial brief description was presented. Answers to some relevant questions for each module unit are presented; however, a deeper critical analysis was needed. Lessons learned are not discussed. Key points are summarised, but supporting evidence was missed. A demonstration of the running application is also performed, showing how the implemented goals were achieved. The presentation, overall, lacks a clear and logical structure. In general, all materials have correct spellings/grammar with some minor mistakes.
50 - 59	The presentation involves a description of the system, highlighting some refinements over the initial brief description. Answers to some relevant questions for each module unit are presented, highlighting advantages and potential shortcomings; however, a deeper critical analysis was needed. Lessons learned are, to some extent, discussed. Key points are summarised, but some supporting evidence was missed. A demonstration of the running application is also performed, showing how the core goals and implemented stretch goals were achieved. The presentation, overall, offers a clear and logical structure. Presentation slides are designed well and consistent in appearance. In general, all materials have correct spellings/grammar with some minor mistakes. Speaker spoke clearly, did not speak too quickly, and was able to be heard. Speaker adjusted pace, evidence of correct use of language.
60 - 69	The presentation clearly describes the system, highlighting the most important refinements over the initial brief description. Answers to some relevant questions for each module unit are presented, highlighting advantages, and potential shortcomings of the proposed solutions. Lessons learned are to some extent, discussed. Key points are summarised and backed up with evidence, e.g., reliable references are included. A demonstration of the running application is also performed, showing how the core goals and implemented stretch goals were achieved. The presentation, overall, offers a clear and logical structure. The presentation ran within the assigned time. Slides were easy to understand, not crowded, used colour/fonts effectively, and easy to read. Presentation slides are designed well and consistent in appearance. In general, all materials have correct spellings/grammar with some minor mistakes. Speaker spoke clearly, did not speak too quickly, and was able to be heard. Speaker adjusted pace, evidence of correct use of language. Speaker attempted to keep the audience's attention, e.g., by emphasising points.
70 - 79	The presentation clearly describes the system, highlighting the most important refinements over the initial brief description. Answers to the most relevant questions for each module unit are presented, highlighting advantages, some elements of innovation and potential shortcomings of the proposed solutions. Lessons learned are discussed. Key points are summarised and backed up with evidence, e.g., reliable references are included. A demonstration of the running application is also performed, showing how the core goals and implemented stretch goals were achieved. The presentation, overall, offers a clear and logical structure. Audio/Visual

	equipment was managed with proficiency, and the presentation ran within the assigned time. Effective use made of media, e.g., presentations included transitions, used colour well. Slides were easy to understand, not crowded, used colour/fonts effectively, and easy to read. Presentation slides are designed well and consistent in appearance. All materials have correct spellings/grammar. Speaker spoke clearly, did not speak too quickly, and was able to be heard. Speaker adjusted pace, evidence of correct use of language. Speaker attempted to keep the audience's attention, e.g., by emphasising points, storytelling approach.
80 - 100	The presentation clearly describes the system, highlighting the most important refinements over the initial brief description. Answers to the most relevant questions for each module unit are presented, highlighting advantages, a variety of elements of innovation and potential shortcomings of the proposed solutions. Lessons learned are thoroughly discussed. Key points are summarised and backed up with evidence, e.g., reliable references are included. A demonstration of the running application is also performed, showing how the core goals and implemented stretch goals were achieved. The presentation, overall, offers a clear and logical structure. The material is easy to follow, e.g., the use of signposting and summaries. Material has sufficient depth/detail. Audio/Visual equipment was managed with proficiency, and the presentation ran within the assigned time. Effective use made of media, e.g., presentations included transitions, used colour well. Slides were easy to understand, not crowded, used colour/fonts effectively, and easy to read. Presentation slides are designed well and consistent in appearance. All materials have correct spellings/grammar. All materials present a professional, business-like image. Speaker made "eye contact" (i.e., looking at the camera), spoke clearly, did not speak too quickly, and was able to be heard. Speaker adjusted pace, evidence of correct use of language. Speaker attempted to keep the audience's attention, e.g., by emphasising points, storytelling approach. The speaker used appropriate body language, e.g., did not fidget and used their hands.