Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2025

Computer Science

Coursework Project Brief

Higher and Ordinary Levels

Time: 12 weeks

90 marks

Information for candidates

The coursework project is worth 90 marks, which is 30% of the overall marks for Leaving Certificate Computer Science. The remaining 210 marks (70%) are for the final examination. You will carry out the project over a period of twelve school weeks, beginning on **Monday December 2nd 2024**. The coursework must be completed by **Wednesday March 19th 2025**. You will present the report in the form of a website comprising of one or more webpages.

Carrying out the project involves responding to a brief by producing a computational artefact and an accompanying report. You will submit the project in digital form. You will capture video footage and/or images of the artefact in operation and embed this into your report.

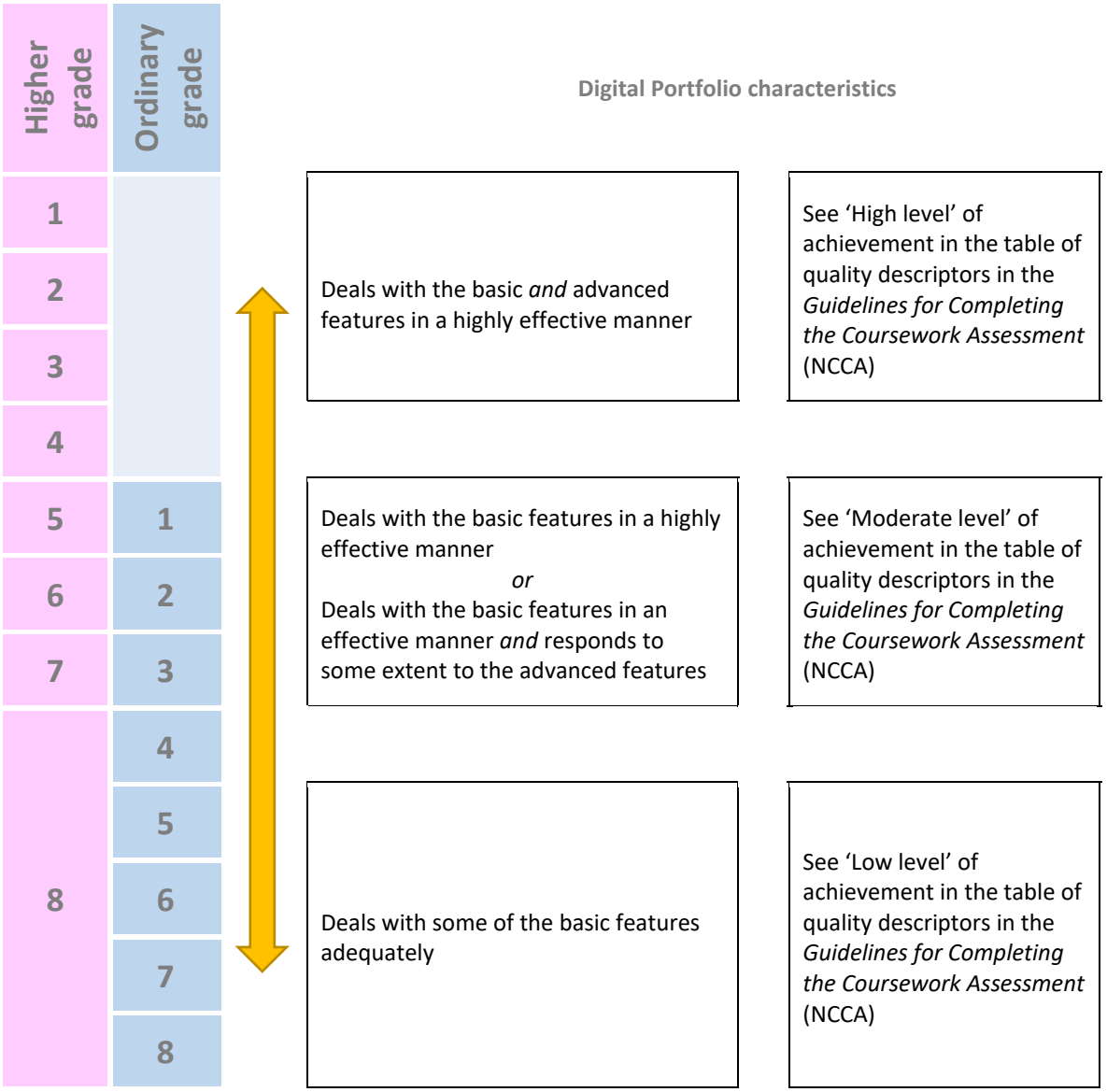
Although you are used to carrying out projects for the *Applied Learning Tasks* in groups, this is an *individual* project. You must carry it out independently of other candidates, and the work you submit must be your own unaided work.

Apart from your initial investigation and research, you must carry out the project in school under the supervision of your teacher. This allows your teacher to authenticate your work to the State Examinations Commission. Because you are carrying out the work under teacher supervision, the teacher is able to guarantee to us that it is your own work, and that nobody gave you any inappropriate help. If you include work that was not supervised by your teacher, then they cannot authenticate it, even if they believe that you really did do it yourself. We cannot accept work for assessment if your teacher cannot authenticate it, so you will forfeit the marks for the project work. Note also that we cannot give partial marks for 'partially authenticated' work. That is, unless *all* of your work can be authenticated by your teacher, we cannot accept *any* of it for marking.

The same project brief applies to Higher and Ordinary level candidates. However, you do not need to make a final decision about which level you are taking when you submit your project. We will grade your project in line with the standards that apply to the level at which you take the final examination.

The project brief sets out some *basic requirements* and *advanced requirements* of the artefact. The way that the standards at the two levels are aligned with each other is illustrated on the left-hand side of the graphic on the next page. This means that, for example, a project that would get a grade 2 at Ordinary level will automatically get a grade 6 at Higher level. You can also see that any project that would get a grade 4 or better at Higher level exceeds the highest standard of work expected at Ordinary level. Because of this, a project of this quality would automatically get full marks at Ordinary level.

It should be noted that it is possible to achieve full marks at Ordinary level by attempting the basic features only.


Higher grade
Ordinary grade
Digital Portfolio characteristics
1
2
3
4
5
6
7
8
1
2
3
4
5
6
7
8
Deals with the basic *and* advanced features in a highly effective manner
See 'High level' of achievement in the table of quality descriptors in the *Guidelines for Completing the Coursework Assessment* (NCCA)
Deals with the basic features in a highly effective manner
or
Deals with the basic features in an effective manner *and* responds to some extent to the advanced features
See 'Moderate level' of achievement in the table of quality descriptors in the *Guidelines for Completing the Coursework Assessment* (NCCA)
Deals with some of the basic features adequately
See 'Low level' of achievement in the table of quality descriptors in the *Guidelines for Completing the Coursework Assessment* (NCCA)

The project brief

Context of the brief

"Data is the new oil. Like oil, data is valuable, but if unrefined it cannot really be used."

Clive Humby

Data is vitally important today because it helps people make smart decisions and come up with new ideas. Businesses use data to understand what customers want and how well they are doing, which helps them make better plans. In healthcare, data helps doctors give better treatments and predict health issues. Governments use data to spend money wisely and solve problems, which helps the economy and society grow. Being able to use and understand data is crucial for success in today's world.

There are a large number of publicly accessible datasets from the Irish government, public bodies and other worldwide data repositories available online. These resources give everyone access to non-personal government and public data which can deliver enhanced economic, social, environmental and democratic benefits to all. Data is often made public in order to benefit society by promoting enhanced innovation and fair competition.

The data that is available covers a wide area of society including agriculture, fisheries, art, culture, sports, housing, health, transport, energy and much more.

The task

For this project you are required to select a publicly available dataset from any reliable source that is relevant to your interests or an area that you feel is important for society. You will create an active information system to display analytics on your chosen dataset.

Basic requirements

1. Collect and prepare the data
    a. Select the dataset you will use.
    b. Use Python to extract, clean and store the data that you will need for your project into a suitable format.
    will need to provide clear evidence of how you extracted, cleaned and stored this data set.

2. Data analytics and visualisation
    a. Use Python to carry out analytics on your data and to create at least two different basic visualisations (e.g., bar chart, line graph, pie chart) with each representing different key aspects of the dataset.
    b. Ensure that each visualisation is clearly labelled with titles, axis labels, and legends where appropriate.
    c. You should use Python data structure(s) such as lists, tuples or dictionaries to manage the data you will be analysing.

3. Create a basic interactive information system interface
    a. Develop a web-based interface to provide the public with information about your chosen dataset.
    b. ay the data visualisations you have created in the information system.

Advanced requirements

1. re that users can interact with the data visualisations on the information system (e.g., over to see details, click to filter data, change ranges, etc.).

2. te a form or poll relating to your chosen dataset on your information system that collects and stores data from the users. This form must show evidence of the use of JavaScript.
    a. The data collected should contain at least three rent data types.
    b. The data should be validated and stored in a database or file.
    c. Some aspect of the collected data from all users should be summarised and displayed through the information system.

3. te a separate area on your information system that makes recommendations or helps inform decisions based on your analysis of your chosen dataset.

Recommended Python libraries/modules

Python has a number of freely available libraries that can assist you with your project. The list below is a small example but this is not an exhaustive list and any other libraries may be used.

- json – for reading json data structures
- pandas – data analysis and manipulation tool
- numpy – package for numerical computation
- matplotlib – creating static, animated, and interactive visualisations in Python
- seaborn – data visualisation library
- plotly – graphing library
- pygal – python library for charts

Further research

Below are some links to more detailed information relating to the context of the brief. The list is neither exclusive nor exhaustive and is supplied to assist you with your own ideas and research. Some may provide inspiration for the task set out in the next section of this document.

URL	Description
https://irishcycle.com/dublinbikes/	Example of an information system using publicly available data
https://covid19ireland-geohive.hub.arcgis.com/	Example of an interactive information system using publicly available data
https://www2.hse.ie/services/urgent-emergency-care-report/	Example of an interactive information system
https://data.gov.ie/showcase	Examples of how data from the data.gov.ie website has been used
https://data.gov.ie/dataset/	Search thousands of government datasets
https://libguides.ucd.ie/gisguide/FindSpatialData	List of publicly available Irish datasets
https://www.cso.ie/en/databases/	List of Irish datasets supplied by the Central Statistics Office
https://www.kaggle.com/datasets	Large collection of publicly accessible datasets
https://datasetsearch.research.google.com/	Google dataset search facility
https://www.tableau.com/learn/articles/free-public-data-sets	List of free public datasets
https://data.world/datasets/free	List of free public datasets
https://data.worldbank.org/	Free datasets supplied by the World Bank

Coursework report – content and structure

The report should be presented as a website and be structured using the headings outlined in the following pages. Marks will only be awarded for information provided under the relevant heading.

The report should contain no more than 2500 words. Failure to adhere to the word count may result in you forfeiting marks. You should ensure that the file structure of your artefact is clear, so that you can clearly reference files or programs in your report.

1. Meeting the brief (400 words)

As part of your report you are required to include a video showing the artefact in operation. The video must not be more than five minutes in duration and be no more than 1GB in size.

The video should be used to demonstrate how your artefact meets the basic and/or advanced requirements of the brief. You should deal with each requirement you attempted in the video and demonstrate how you have achieved it.

You may wish to include a brief written description, with images, demonstrating how your artefact meets each of the requirements. You will not be penalised marks for not including any text if your video is sufficient in describing how you meet each of the requirements.

2. Investigation (approximately 400 words)

In this section of the report you should show evidence of your own research on the brief, including research on existing solutions, systems or ideas that are aligned to the brief. You should research both existing interactive information systems that can inspire your project and the area or topic that you wish to analyse in your information system.

As a starting point you may consider using the URLs provided earlier in this document, but please note that this list is neither exclusive nor exhaustive. All references should be included in the reference section of your report.

3. Plan and design (approximately 400 words)

This section of the report should contain a clear description of the design of your project and how it will meet the requirements set out in the brief.

You should explain each of the technologies that you plan to use and how they will be used within your project. This should cover all aspects of software you plan to use for the artefact.

You should include a detailed flowchart which gives an overview of how your system will work.

4. Create (approximately 1000 words)

This section should include a progress log which gives an overview of the development process. It is suggested that this progress log is updated weekly or fortnightly. This should include the key milestones from that week/fortnight. An example of how one week of this log might look is shown below.

> Week 3:
> - Dataset read into a list via Python and stored. Printed out the dataset in Python to see if it displayed correctly.
> - Used *replace* function to remove non-numeric characters.
> - Added clean data to new list to be used for creating chart.

You should carry out testing during the development process. A test table should be used to evidence the testing that has taken place throughout the development process and to explain the outcomes of the testing.

You should explain one of the problems that you encountered during the implementation and describe how you overcame the problem.

You should clearly explain the algorithm that you designed for the analytics part of your project. This should be supported by providing pseudocode of the algorithm and an explanation of the code. Please note that the pseudocode and code do not count towards your word count.

5. Evaluation (approximately 300 words)

You should evaluate the final artefact in relation to the requirements set out in the brief.

You should suggest, with justification, how your artefact could be improved or iterated upon in the future.

6. References

You must reference and acknowledge all research sources used such as: publications including books, professional journals and government reports; online sources and other types of media; source code; and material from specialist organisations and relevant individuals. To include such material without properly referencing the source will be considered plagiarism. In addition, the copying from, or reproduction of, material from such sources may also be considered plagiarism.

7. Summary word count

You must include a summary of the word count of your report. This could be presented in the form of a table, as shown below, and should show the word count for each section as well as the overall word count.

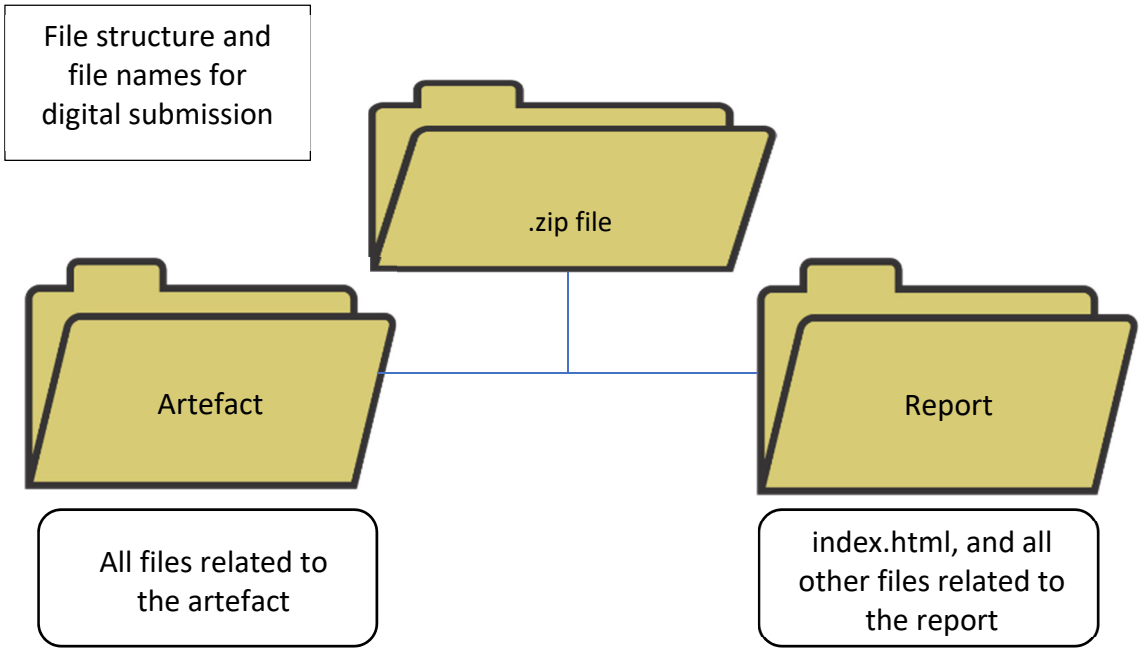
Section	Word Count
1. Meeting the brief	
2. Investigation	
3. Plan and design	
4. Create	
5. Evaluation	
Total:	

Outline marking scheme

Coursework (90 marks in total)	
The report	***Marks***
• Quality of report website structure and layout. • Evidence of adherence to the principles of good user interface design when creating the website. • Adherence to the word count (penalties may apply).	**5**
1. Meeting the brief	
• Meeting the basic requirements of the brief. • Meeting the advanced requirements of the brief.	**27**
2. Investigation	
• Research into existing interactive information systems. • Research into the chosen area or topic that will be analysed through the information system.	**10**
3. Plan and design	
• A clear, detailed description of the project and how it will meet the requirements. • A description of the technologies you will use and their role within your project. • A flowchart diagram to show how the project will work.	**15**
4. Create	
• A progress log covering the key milestones of the development process. • Evidence of testing applied during development. • Explain a problem that was encountered in the development of the project and how it was overcome. • An explanation of an algorithm that you designed that has been used for the analytics of your project.	**25**
5. Evaluation	
• An evaluation of your project based on the requirements set out in the brief. • Suggest how you would further improve/iterate this project.	**8**
References and summary word count	
• You must also include references and/or a bibliography. • Include a summary of the word count of the report, including the total word count.	**0**

Instructions on completing and submitting the coursework

1. Your coursework project that is submitted for assessment must comprise of the following two components:
   - The digital components of the computational artefact, including all relevant programs in the prescribed languages.
   - A coursework report, submitted on a website, of no more than 2500 words, including a video presentation of no longer than 5 minutes. The video should be no more than 1GB in size. This readily can be achieved by using standard definition (720 x 480) at 25 frames per second and a suitable commonly used format. Individuals should not be identifiable in the video but you may include a voiceover in order to explain the features of your artefact. The video must not be hosted online and must be accessible within the folder structure described below.
     Penalties may apply where the overall word count or video length or size is exceeded.
2. Some of the research and investigation that you carry out for the project and describe in section two of your report, 'Investigation', can be completed outside of class time. However, the actual writing of the report and all of the work on the artefact itself must be done in class under the supervision of your teacher so that they can authenticate your work.
3. Your coursework project must be saved in a single zipped file (.zip). The project will be submitted through the online Schools Portal, with details, including the naming convention for the zip file, included in a circular that was issued to your school.
4. Online databases may not be accessible by the examiner marking your project. Therefore, it is essential that your video demonstrates fully how your artefact works.
5. The .zip file, when extracted, should be a folder that contains exactly two subfolders, as in the diagram below.



a. One of these sub-folders should be called “Report” and should contain all of the files relating to the report. It should be possible to access the complete report by opening a file named “index.html” at the top level within the “Report” folder. That is, all of the content of the report should either be in this file itself or be accessible via links from within this file to local files. Any subsidiary files, such as additional html files, css stylesheets, image files, and so on, must also be in the “Report” folder, either at the same level as index.html or within a further suitable folder structure.

b. The other sub-folder should be called “Artefact” and should contain the essential digital components of your artefact. The file structure of your artefact should be made clear. For example, if there is a main, supervising program, from which other programs are imported or called, this program should be clearly named in the sub-folder and referenced in the description in the coursework report.

6. The website must **not** be an online website (e.g. Google Site, Wix, etc.). It must be saved as an accessible HTML file in the folder structure described in this section. Failure to present your website in this way will result in you forfeiting marks.

7. It is **your** responsibility to ensure that all electronic materials submitted are free from viruses, so that examiners can open all required files for assessment, and all code supplied can be evaluated.

8. All data and information in the artefact should be anonymised and comply with GDPR. If an artefact uses programming languages other than Python and JavaScript, these files can also be included in this sub-folder. In such cases, you cannot assume that the examiner will be familiar with the programming language concerned, so the responsibility for demonstrating its accuracy rests with you.

9. It is your responsibility to ensure that all of the required files are contained in the zipped file prior to submission of the work. You may lose marks if required files are omitted. Marks may be lost for not conforming to the filing structure outlined above, and for not using a clearly labelled file structure for the artefact. A **backup copy** of the submitted files must be retained in your school until the assessment process is complete.

IMPORTANT
It is essential that you double check that your artefact and report can be accessed by the examiner or you will not be credited for the work you have done. If a particular element of your project, such as the video, artefact files or report, is not included you may forfeit marks. Similarly, if your report or any of your files are stored in an online repository such as Google Drive or One Drive it will not be accessible for marking.

Once completed, put the zipped project on a removable medium, bring it to a device that was not used when working on any part of the project. Disconnect that device from the internet. Unzip the project and check that the artefact and the report including all images, video(s), and other files are present and that all links between them are working correctly.

Authentication

- The project and report must be your own individual work – authenticated by yourself, your teacher and the management authority of your school. Authentication is an important part of how we in the State Examinations Commission ensure fairness to everybody in the assessment of coursework.

- Your teacher must supervise your completion of both the project and the report. If your teacher cannot confirm that the project is your own work, and that you carried out the project and completed the report under his or her supervision, the State Examinations Commission will not accept it for assessment. In that case, you will forfeit the marks for this component of the examination. Teachers and the authorities of schools are familiar with the detailed requirements to ensure that practical and project work is valid for examination purposes. You should comply fully with all requests that are made by the teacher and the school in order to enable authentication of your work.

- Any case of suspected copying, plagiarism (which includes the use of AI software), improper assistance, or procurement of work prepared by another party will be thoroughly investigated. These actions are breaches of examination rules and attract the penalties described in the Rules and Programme for Secondary Schools. The penalties include: loss of the marks for the coursework, loss of the subject, loss of the entire examination in all subjects, or being debarred from the Certificate Examinations in subsequent years. There may be serious consequences for any persons who provides you with inappropriate assistance, as this is an offence under the Education Act 1998.

- Further information relating to coursework authentication can be found in circular S76/22.

Note: Responsibility for complying with examination requirements rests with you, the candidate. If the requirements are not followed, your teacher and school will have no choice but to bring this to the attention of the State Examinations Commission.

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Leaving Certificate – Higher and Ordinary Levels

Computer Science, Coursework

Leaving Certificate Examination 2025
Twelve weeks