

Computer Science extended essay

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Grade boundaries

Overall

Grade:	E	D	C	B	A
Mark range:	0-6	7-13	14-20	21-26	27-34

Extended essay

The range and suitability of the work submitted

Nearly all of the submitted essays were within the scope of computer science. There were fewer essays focused on digital society. A range of topics was submitted, but machine learning is prominently featured. Other common topics included random number generators, pathfinding, sorting, binary search trees, and encryption algorithms.

Student performance against each criterion

Criterion A: focus and method

The majority of essays were suitably focused and appropriate for the subject. Not all students stated their research question in the introduction. On too many occasions, it was missing entirely or different from the research question on the front cover.

Many students did not explain why their research was worthwhile. Literature references should support this rationale and include definitions of the technical language. Too often, acronyms were included in the research question and not explained.

Essays that scored highly included an outline methodology in the introduction. This approach provides a clear roadmap of how the research question will be addressed throughout the essay. Explaining the methodological choices or academic approach provides more structure and focus. Too many introductions are generic and use sensationalistic language. Students should keep the introduction focused by using information supported in the literature.

Criterion B: knowledge and understanding

Criterion B is an area in which students perform well. They demonstrate the ability to research, describe the topic's technical aspects and reference appropriately. Despite this, many students include background information not directly relevant to their research question. For example, an essay on fine-tuning two hyperparameters in a supervised learning algorithm often includes a section on AI, unsupervised learning, reinforcement learning, and neural networks. While providing an overview of the topic area is fine, they should delve into it more deeply than widely.

Students should explain rather than describe the computer science aspects of their research and evaluate it by referencing a range of academic papers. Too many essays are descriptive, cite only online sources, and repeatedly use the same sources.

Criterion C: critical thinking

Not many students reached the top band for this criterion. Too frequently, an excellent experiment is analysed superficially. Too often, analysis is limited to a written repetition of what the tables of results and/or graphs show.

An essay that develops a clear and coherent argument incorporating all of the researched information will only come from one that has established a focused research question and a well-thought-out road map. Analysis of results should go further than spotting patterns, and essays should explore the computer science that influenced them.

Many students acknowledge their research's limitations. This is important, as it can lead to a critical final analysis. However, few students do this effectively. They merely suggest that they could have compared additional algorithms or used larger datasets.

Criterion D: presentation

The overall structure is generally good. Few essays were free from presentation errors. Common issues include blurry images and failing to label all diagrams and charts. Even when figures are labelled correctly, many students forget to reference them. One frequent mistake is multiple pages of tables and charts in the findings. The text that describes the results is often pages away from the figure.

Students are advised to set aside ample time during their planning phase to proofread their presentations early in the investigation rather than waiting until the last minute to arrange the essay.

Criterion E: engagement

The reflection is an opportunity for the students to showcase pivotal moments that influenced the essay's development. The better reflections demonstrate a high level of involvement by explaining the decisions they made and the experience gained. Frequently, the reflections are often descriptive, outlining events chronologically rather than analysing them.

Students are advised to make note of any critical decisions during the investigation. Documenting during the process produces keener insights and enhances the overall reflection.

Recommendations for the supervision of future students

Students should be instructed to research their proposed topics at the outset of the process. This will enable them to formulate a focused and academically valuable research question for which ample resources are available. Too many students embark on this process without a clear direction.

An EE in computer science offers the opportunity to research a topic that explores recent developments. Students should take advantage of this opportunity instead of reverting to topics that deal with old technology (e.g., comparing sorting routines).

Students should make better use of the introduction. As well as stating the research question, this should include a brief overview of different computer science concepts identified in the RQ. The introduction should make the academic worthiness of the proposed research clear. The approach to answering the research question should be included. If an experiment is used to answer the research question, state that fact.

The many elements involved in the research and writing processes involved in developing an EE should have been taught to the students before the actual EE process starts. Some students struggle with referencing and writing in the appropriate academic style. While supervisors have a role in reinforcing the understanding and utilisation of these elements, they should not be responsible for teaching them for the first time.

Schools should provide appropriate guidance for using large language models like ChatGPT. Currently, they are being used inappropriately in multiple essays. Incorrect referencing is an issue. Just as concerning is when paragraphs of beautiful prose have been generated, but they say nothing of value.