

Essay**Due: 8pm, 6 May 2022****Research question: Cut elimination**

Normalization in the typed lambda-calculus has an analogue in logic, called **cut elimination**, that is highly significant to the use of logic as a foundation of mathematics. In this essay assignment, you will explore the significance of cut-elimination and the relation between normalization and cut-elimination, as part of the **Curry–Howard correspondence**).

Assignment Write a short essay (1000–1500 words) on **the historical and contemporary significance of cut-elimination in logic**. Your essay should address the following points:

- the historical development of logic
- the cut-elimination theorem by Gerhard Gentzen
- the significance of cut-elimination to the foundations of mathematics
- the Curry–Howard correspondence relating logic to computation

You should make use of the scientific literature on programming and mathematics to inform your answer. You may find many Wikipedia entries and blog posts about logic, cut-elimination, and the Curry–Howard correspondence. These are a good starting point in your search for literature to refer to, but are **not** definitive references. By all means use them to develop your understanding, but you should aim to seek out scientific research papers, textbook descriptions, and similar definitive documents to support your answer. Marks are allocated not only for your answer but also for the choice of reference sources and the presentation of your bibliography.

Submission and Marking Scheme

Submit your essay as a PDF file named [Essay.pdf](#) on Moodle 6 May 8pm. Preferably, write your essay using appropriate software such as L^AT_EX or Word. You may write it by hand and scan it to PDF. Please ensure the document is **clearly legible** and **well presented**. The marks available for this assignment are allocated as follows:

- historical background: 20 marks
- cut-elimination theorem: 20 marks
- description of its importance: 20 marks
- Curry-Howard correspondence: 20 marks
- literature sources and bibliography: 20 marks