

Preliminary Project Briefing for CST IB Students

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May 2020

For students reading Part II in 2020–2021

(With thanks to all prior project briefing officers for slides)

What's this all about?

Next year you submit a dissertation

Worth one paper

What's this all about?

Next year you submit a dissertation

Worth one paper

Which is a **quarter** of your total marks!

So what kind of project can I do?

Here are some titles from prior years

- ▶ Software IPv6 Router In Rust
- ▶ An Optimising Compiler from Haskell to Java Bytecode
- ▶ Removing gender bias from word embeddings
- ▶ Implementing a Dependently Typed Language
- ▶ A Secure USB Keyboard

Aims of the project

The main goals are to

- ▶ Demonstrate computer science skills
- ▶ Design, implement, test something substantial
- ▶ Select suitable methods and tools
- ▶ Prepare a convincing report

In addition to

- ▶ Demonstrate ability to select appropriate
 - ▶ Languages, techniques, algorithms, tools, data structures, etc
- ▶ Demonstrate understanding of the project's area
 - ▶ Professional use of appropriate standard algorithms, tools, etc
 - ▶ Relationship to computer science
 - ▶ Awareness of standard results & literature
 - ▶ Avoid inadvertently re-inventing the wheel

Also, to show ability to

- ▶ Prepare a well-structured and readable document
- ▶ Demonstrate technical writing skills
- ▶ Prepare a report that convinces its readers that stated objectives are achieved

CST project timetable

Start of Michaelmas term

Formal project briefing

A fortnight later

Proposal deadline

February

Progress report

Early May

Dissertation deadline

Key people

Supervisor

- ▶ You need to find someone to supervise your project
- ▶ You will likely meet with them weekly during term

Overseers

- ▶ You will be assigned two overseers to guide you at key times

Directors of Studies

- ▶ Your DoS can help advise on projects and supervisors
- ▶ And will also take a keen interest in your progress!

Overseers help plan the project and monitor progress

- ▶ The briefing officer (i.e. me!) assigns two per student
- ▶ They oversee selection and approval of
 - ▶ A suitable project
 - ▶ Its plan
- ▶ They check requirements are satisfiable
 - ▶ Computing equipment to be used
 - ▶ Other special equipment or resources
 - ▶ IPR, human experiments and other legal obligations
- ▶ Liaise with your DoS, especially mid-project

The briefing officer will help if you have problems with your overseers

Ideas and requirements

The main sources of project ideas are

- ▶ Your own (moderated) ideas
- ▶ Supervisors and Directors of Studies
- ▶ Suggestions on the projects webpage
- ▶ Previous years' projects
- ▶ Industry

In order to get your proposal accepted, you must

- ▶ Have a named project supervisor
- ▶ Ensure both your overseers are happy
- ▶ Obtain written permission for special resources and experiments
 - ▶ E.g. tests using human subjects

Content, narrative and evaluation

Content

- ▶ Choose something with significant technical content
- ▶ Ideally implement some complex algorithm
- ▶ Do not do something big yet simple

Narrative

- ▶ Choose something interesting
- ▶ Phrase a question or two at the outset
- ▶ Answer the questions in the conclusion

Evaluation

- ▶ Choose a project amenable to structured evaluation
- ▶ *'It worked according to plan'* is not sufficient
- ▶ Components ideally separately testable
- ▶ Composition ideally evaluable using several metrics

Use appropriate tools

Think about tools carefully

- ▶ Need a parser: use a parser generator
- ▶ Need to optimise in multiple dimensions: use a hill-climbing library
- ▶ Need to solve NP problem: use a standard SAT solver
- ▶ Need to visualise networks: output via dot

Many projects are done in Java or C++,

- ▶ But consider OCaml/F#, Scala or C#
- ▶ (Or Rust, Swift, Go, ...)

Use the long vacation to explore tools, libraries and languages

Equipment

Standard resource is the MCS facility

You can use other and/or non-standard equipment or libraries

- ▶ Needs written permission from resource owner

Certainly use git or some other version control system

Relying **only** on your own PC is very risky

- ▶ Have a backup plan identifying a second PC or MCS
- ▶ Keep backups on MCS filesystem or cloud server

Your tasks now

After IB exams are done

- ▶ Look at old projects
 - ▶ Available in the online through the project web pages
- ▶ Read up background material
- ▶ Think about tools
 - ▶ Read documentation
 - ▶ Play with toy examples
- ▶ Start a project log book
 - ▶ A hard-back notebook is ideal

Can I start implementing now?

In short, no!

You must get approval from your overseers

- ▶ And they may not give this approval

However, more importantly, your proposal defines a **starting point**

- ▶ This is the state of the world mid-October
- ▶ It does not matter whether someone else or you yourself did the previous work

How much time should I spend on my project?

- ▶ One paper's worth

What's the format of the dissertation?

- ▶ There will be more information in your formal project briefing in October
- ▶ But you can look at the project web pages and old projects to get an idea now

How can I prepare for my project?

- ▶ Think about potential projects
- ▶ Contact potential supervisors
- ▶ Arrive back in October with a proposal draft

Units of assessment

Those of you reading the 75% option take two Part II units of assessment

- ▶ Take note of the assessment dates and include them in your project plan
- ▶ Session timetables will have hardly any clashes with other Part II material
 - ▶ So there is a good chance you can attend sessions you are not registered for
 - ▶ (But seminar and practical class space may be limited)
- ▶ Bear in mind that these may involve extra coursework alongside your dissertation
 - ▶ Plan when you'll do unit work vs project work

The project web page is

<https://www.cl.cam.ac.uk/teaching/projects/>

Here you'll find links to:

- ▶ These slides
- ▶ The pink book, your project bible
- ▶ Project suggestions

Any questions, any time, please ask

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That's it

See you next year!

That's it

See you next year!

Virtually, if not otherwise