# Compiler Construction
# Supervision 4

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All work should be submitted in PDF form 36 hours before the supervision to the email `josi2@cam.ac.uk`. If you have any questions on the course please include these at the top of the supervision work and we can talk about them in the supervision.

1. What is lexical and syntactic analysis, what mathematical tools are generally used to perform these analyses?

2. `https://www.cl.cam.ac.uk/teaching/exams/pastpapers/y2004p5q7.pdf`

3. `http://www.cl.cam.ac.uk/teaching/exams/pastpapers/y2004p4q1.pdf`

   What is the input to the `ParseTree`, how could this be generated from a text file?

4. `http://www.cl.cam.ac.uk/teaching/exams/pastpapers/y2015p3q3.pdf`

5. *Extension*

   (a) `http://www.cl.cam.ac.uk/teaching/exams/pastpapers/y2003p4q1.pdf`
       (in (b) construct a LR(0) CFSM)

   (b) Compute [FIRST, FOLLOW, nullable], then fill out a *Predictive Parsing Table*.

6. Practical exercise: `https://www.cl.cam.ac.uk/teaching/1920/CompConstr/practical.txt`

   (a)     *Modify lexer to handle nested comments.*

   (b)     *Improve the concrete syntax of Slang by changing the parser. Also see if you can make some of the type annotations optional.*

   Make sure to remove type annotations where possible, I am not so concerned about other 'improvements'. This will involve changing the parser and type checker (starting to carry out type inference).