MODEL ANSWER S/W ENGINEERING & DESIGN (PAPER 11, QUESTION 11) AFB
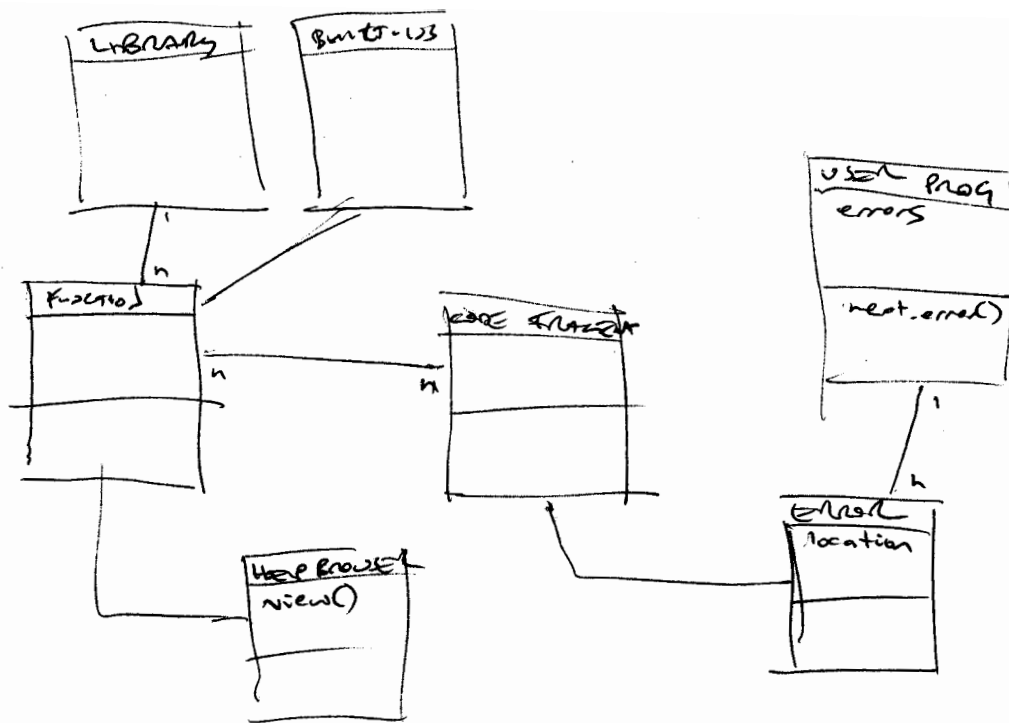
2004

a) Because the waterfall model assumes that specifications can be fixed, so that subsequent design work is based on an agreed set of functions. Designing a compiler to comply with an existing language specification is somewhat like this.
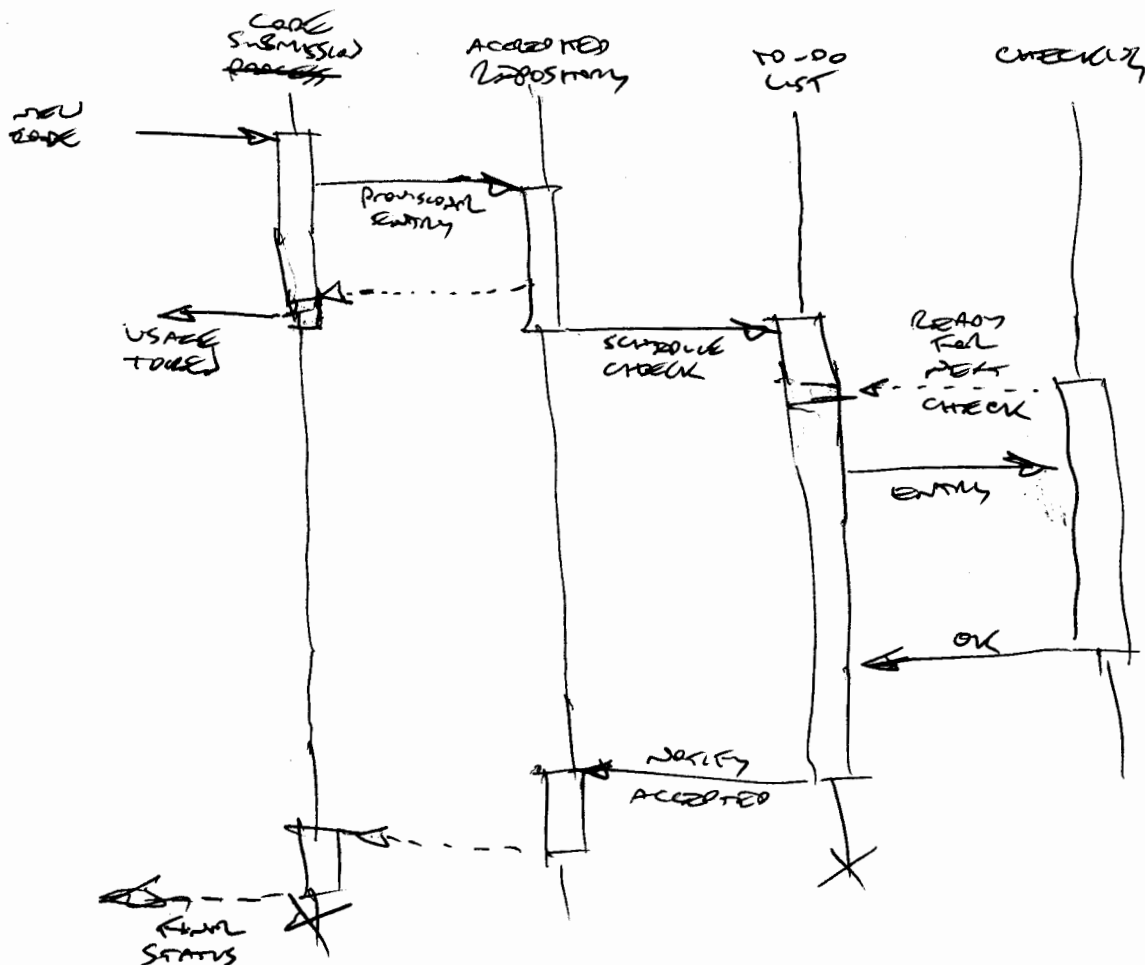
b) Programming languages are normally designed by computer scientists, based on desirable theoretical properties. If the language is to be used by either computer scientists, then this approach, based on an intuitive understanding of users own needs, might be appropriate. However if a language was being designed for a different class of user (perhaps less technically skilled) then they might need a different set of features.

The development process would instead start with observation of typical users, and perhaps interviews with the users. Research into user experience and performance could be incorporated. Iterative prototyping could be done, making mock-ups of parts of the programming environment, then asking representative users to write programs under controlled conditions measuring speed and accuracy with which they achieve this.

c) The first innovation might be a help system that responds to syntax errors by bringing up a browser pre-loaded with guidance on legal constructs when a syntax error has been detected, especially if this is related to system library functions

A UML class diagram with boxes labeled: LIBRARY, BUILT-INS, FUNCTION, CODE FRAGMENT, USER PROG (errors, next.error()), ERROR (location), HELP BROWSER (view()). Relationships marked with multiplicities 1, n.

THE SECOND INNOVATION MIGHT BE A SYSTEM FOR ONLINE CODE SHARING AND ACCREDITATION, IN WHICH USERS HAVE THEIR CODE CHECKED BY AN EXPERT AND MADE AVAILABLE TO OTHERS

A sequence diagram with lifelines: CODE SUBMISSION PROCESS, ACCEPTED REPOSITORY, TO-DO LIST, CHECKER. Messages: NEW CODE, Provisional Entry, USAGE TOKEN, SCHEDULE CHECK, READY FOR NEXT CHECK, ENTRY, OK, NOTIFY ACCEPTED, FINAL STATUS.

COMPLETED IN 23 MINUTES

MARKER GUIDE S/W ENGINEERING & DESIGN (PAPER II, QUESTION II)

a) ONE MARK FOR NOTING THAT WATERFALL ASSUMES FIXED SPECIFICATIONS, ONE MARK FOR NOTING WHY COMPILERS MAY BE LIKE THIS.

b) ONE MARK FOR EACH DESCRIPTION OF CURRENT DESIGN PRACTICE THAT MIGHT CHANGE, ONE FOR EACH DESCRIPTION OF NEW ACTIVITIES (OBSERVATION, PROTOTYPING, TRIALS ETC) A FURTHER MARK IF SOME SPECIFIC OBSERVATION IS MADE ABOUT HOW OUTCOMES WOULD CHANGE AS A RESULT

c) 5 MARKS EACH. FIRST MARK FOR A PLAUSIBLE INNOVATION THAT IS MOTIVATED BY USER BEHAVIOUR, ONE MARK FOR DESCRIBING HOW THIS MIGHT ARISE FROM ~~DESIGN~~ USER-CENTRED PROCESS, ONE MARK IF DIAGRAM HAS COMPONENTS THAT SHOULD PRODUCE THIS, ONE MARK IF IT IS RECOGNISABLY A UML DIAGRAM AS REQUIRED, ONE MARK IF UML SYNTAX IS CORRECT (NO MORE THAN ONE SYNTAX ERROR).