OOD Assignment 2014 – To be performed in groups of three people.

Your task is to write a simple BASIC interpreter:

You will be glad to know you do not need to implement the full language, just a small subset of the commands. Your interpreter should recognise the commands PRINT, LET, GOTO, INPUT, IF/ENDIF. See example programs.

Your solution should take the name of a text file as a command line argument and load its contents into memory before executing the program. NB it should read the file only once sequentially at the start of the programme.

Three example programs are provided:

Prog1, Prog2, Prog3, Prog4

Several unseen files will be used in testing to see if your program operates correctly. They will adhere to the format and use the 7 commands listed above. However, one of these files will contain errors to see how your program handles them.

Notes:

- All variables declared with LET have global scope.
- The LET command needs to support 4 basic mathematical operations (+,-,*,/) as well as simple assignment. It does not need to support compound expressions that involving more than 2 terms or brackets.
- The PRINT statement only prints a single item, either a string or variable.

Design Specification Hints.

Use polymorphism to build an object which can be stored in a datastructure such as an stl::map but uses polymorphism to perform different actions depending upon the type. You may find an stl::map is also useful to maintain a list of variables. Use overloaded input/output operators to read in the content of the file.

Assessment

The project will be assessed in three parts:

1) Initial Design: description of design and specification [20%] Due (Week 8) Mon 24/11/2014 4pm

2) Quality of code; good structure, correct use of language features, clarity of implementation, error checking, good comments [60%] Due (Week 11) Mon 15/12/2014 4pm

3) Working code: demonstration of full implementation [20%] To be performed in Week 11 laboratory session 16/12/12

Submission details:

Title: Preliminary Design
Length: 1 Page Max A4 11pt text
Contents: The title, names of members of group and login id's. It should then discuss the software design in broad terms: include decisions on the overall software design (with diagram of class hierarchy), the memory management used, error handling and any additional related class and functionality implemented.

Title: Final Submission
Length: 1 Page A4 11pt text + compact printout of code
Content: A Title page stating team members names and login id's and declaring their contributions to the project i.e. 33% each. Each student should sign this declaration to show they agree with the weight of their contribution. A clear class hierarchy diagram should be included followed by a compact printout of the code.

Feedback and Marking: The purpose of the initial design is to force the students to think about the problem and solution prior to implementation. Feedback on design will be given to the whole cohort in the lecture immediately following submission (25th Nov). In this lecture an idealised design will be discussed. This will allow students to judge the suitability of their own designs and make amendments prior to implementation. A mark for the design will be provided at a later date. The final implementation will be marked against the attributes: Design Quality, Code Structure, Use of Language Features, Clarity of Implementation, Error Checking and Comments. Feedback will also be provided on the strengths and weaknesses of the implementation.

Prog1.txt

```
10 PRINT "HELLO "
20 GOTO 10
```

Prog2.txt

```
10 PRINT "HELLO, PLEASE ENTER A NUMBER"
20 INPUT A
30 PRINT "YOU ENTERED "
40 PRINT A
50 PRINT "\n"
60 PRINT A
70 PRINT " SQUARED IS "
80 LET B=A*A
90 PRINT B
```

Prog3.txt

```
10 PRINT "WHICH TIMES TABLE SHOULD I PRINT"
20 INPUT A
30 LET B=1
40 LET RESULT=A*B
50 PRINT A
60 PRINT " X "
70 PRINT B
80 PRINT " = "
90 PRINT RESULT
100 PRINT "\n"
110 LET B=B+1
120 GOTO 40
```

Prog4.txt

```
10 PRINT "How many legs does a horse have\n"
20 INPUT A
30 IF A=10 THEN
40 PRINT "Think your smart do you\n"
50 PRINT "Bye Bye\n"
60 GOTO 10
70 ENDIF
80 PRINT A
90 PRINT ", no, 10, 2 fore legs and 2 hind\n"
100 PRINT "Ho Ho!!\n"
110 GOTO 10
```