City University
School of Engineering and Mathematical Sciences
Common Part 1

ME1107 Computing

Coursework 3A – Fortran

Q1-Q6:

- Submission: hardcopy (printed on A4 papers with a coversheet) to Dr Yan and softcopy (Word document CW3A_your_name.doc and all FORTRAN source files .f95) to CitySpace.
- Due date: 17/11/2008

Q7: in-class marking in week 8 commencing 17/11/08. No late submission will be accepted.

Q1 (5 marks)
Use the Silverfrost Plato IDE to run the following program (save it as MyProgram1_yourname.f95)

```
!
!   Your name, Group
!   Date
!
! Hello World

Program Prog1
Print *
Print *,'Hello World'
Print *
Print *,' your name, group'
Print *,' email address'
Print *, 'Personal tutor's name'
End Prog1
```

Copy the program to the Word document as part of the answer. Show the program output (the black DOS window) in the Word document (use Prt Scr key to copy the screen as an image and paste it in the Word document). MyProgram1_yourname.f95 should be submitted to CitySpace.

Q2 (20 marks)
Read the example program (Quadratic equation solver (real roots)) on page 6 of the Fortran95 Manual and answer following questions (write your answers in the Word document):

Note: Some answers can be found in the online Fortran95 Manual

1) Which symbol is used to start a comment line? How many comment lines in the example program?
2) Give two examples of constants in the example program.
3) List all the variables (name and type) in the program.
4) What is '=' in a program?
5) How do you write $z = x^y$ in a FORTRAN program?
6) The main program has the structure

    [PROGRAM [name]]
    [declaration statements]
    [executable statements]
    END [PROGRAM [name]]

What do the square brackets mean in the program structure?
7) What is the name of the example program?
8) Is FORTRAN case sensitive? Give an example of programming language, which is case sensitive.
9) Draw a flowchart for this program (hand drawing is acceptable)

Q3 (20 marks)
Answer following questions regarding data/variable types in FORTRAN language (write your answers in the Word document).

Note: Some answers can be found in the online Fortran95 Manual

1) Give 5 examples of the alphanumeric characters (which are allowed to be used in variable names).
2) Give 5 examples of the special symbols.
3) How many types of tokens in FORTRAN language, and what are they?
4) What are the rules for choosing a valid variable name?
5) Identify the following constants as REAL, INTEGER, CHAR or COMPLEX
0 _____ area _____ 13.76 _____ 1024 _____ 8M _____

20 + 10 i _____ -100 _____ 1.5 E-1 _____ +110 _____ 0.0 _____
6) The older versions of FORTRAN (such as FORTRAN77) implicitly assumed a type for a variable depending on the first letter of its name. List all the letters, which are assigned for the integer type.

Q4 (10 marks)
Read the following program and answer the questions.

```
!
!   Your name, Group
!   Date
!
! finds surface area and volume of a cylinder
!
      Program cylinder
      IMPLICIT NONE
      Real pi, dia, length, sarea, vol
      pi = 4*atan(1.0)
      write(*,*)'diameter of cylinder?'
      read(*,*)dia
      write(*,*)'length of cylinder?'
      read(*,*)length
      sarea = pi*dia*length
      vol = pi*(dia**2)*length/4.
      write(*,*)' '
      write(*,*)'diameter of cyl.     =',dia
      write(*,*)'length of cyl.       =',length
      write(*,*)'surface area of cyl. =',sarea
      write(*,*)'volume of cyl.       =',vol
      write(*,*)
      write(*,*)'This program is run by your name, group'
      stop
      end program cylinder
```

Questions regarding the above program (write your answers in the Word document):

1) List all the variables (name and type) in the program
2) What is the program name?
3) How is π calculated in the program?
4) Write one READ statement, which takes input for both the diameter and the length of the cylinder
5) Write one WRITE statement, which displays both the surface area and the volume of the cylinder

Q5 (20 marks)
Write a program (TrigonometricFunctions_yourname.f95) that reads an angle in degrees from the keyboard and prints out the sine, cosine, and tangent of the angle in the form given below:

```
Trigonometric Functions

deg      =  30.0000
sin(deg) =  0.5
cos(deg) =  0.866025388
tan(deg) =  0.577350259

Calculated by your name, group
```

Copy the program to the Word document as part of the answer. Show the program output (the black DOS window) in the Word document (use Prt Scr key to copy the screen as an image and paste it in the Word document). TrigonometricFunctions_yourname.f95 should be submitted to CitySpace.

Q6 (5 marks)
Write a program (save the program as Integer_divisions_yourname.f95) to find out the results of following formulas:

7/2 7.0/2.0 9/10 9.0/10.0 16-5*(16/5) 16.0-5.0*(16.0/5.0)

Write the results of the formulas in the Word document. Copy the program to the Word document. Show the program output (the black DOS window) in the Word document (use Prt Scr key to copy the screen as an image and paste it in the Word document). Integer_divisions_yourname.f95 should be submitted to CitySpace.

Q7 (20 marks)
20 marks will be given to the in-class marking question. You will be asked to write a program on a piece of paper. The program will include declaration of variables and uses of READ and WRITE statements. You are allowed to use the computer to test your program. In-class marking will be done during your tutorial class in week 8 commencing 17/11/08. No late submission will be accepted for this question.