

Math 248 Computers and Numerical Algorithms–Pruett

LABORATORY ASSIGNMENT Variable Types and Type Declarations

1. Enter and compile the following program:

```
program real_thing
! -----
! Program real_thing 1) declares THING to be a real variable,
! 2) reads a value for THING, 3) and outputs that value
! -----
    implicit none
    real :: thing
!
    write (*,*) ' enter a real constant '
    read (*,*) thing
    write (*,*) ' you have entered ', thing
!
    stop
end program real_thing
```

- C_____ Run the program several times with .9, .99, .999, .9999, etc. as data. At how many digits does the output disagree with the input? What does this tell you about REAL arithmetic on a digital computer?
- C_____ Run the program again using a character string (in single quotes) as the input. What happens and why?

See reverse side for more ...

2. Enter and compile the following program:

```
program in_thing
! -----
! Program in_thing 1) declares THING to be an integer variable,
! 2) assigns a value for THING, 3) and outputs that value
! -----
    implicit none
    integer :: thing
!
! initial assignment
!
    thing = 77
    write (*,*) ' THING has the value ', thing
!
! new assignment
!
    thing = thing + 1
    write (*,*) ' THING has the new value ', thing
!
    stop
end program in_thing
```

B..... Explain in words what happens during execution of the second assignment statement.

3. Enter and compile the following program:

```
program string_thing
! -----
! Program string_thing 1) declares THING to be a character variable,
! 2) assigns a value for THING, 3) and outputs that value
! -----
    implicit none
    character(10) :: thing
!
    write (*,*) ' enter a character string for THING '
    read (*,*) thing
    write (*,*) ' THING has the value '
    write (*,*) thing
!
    stop
end program string_thing
```

A..... Run the program for the input data 'Geronimo' and write out exactly what the computer prints.

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A..... Change the 10 above to 5, recompile, run for the input data 'Geronimo', and write out exactly what the computer prints.