

Math 248 Computers and Numerical Algorithms–Pruett

LABORATORY ASSIGNMENT Programming for Repetition–Loop Constructs

- C_____ Write, compile, and run a Fortran90 program that uses a **DO-EXIT** loop construct to count from 1 to 100 in integer arithmetic; print out the value of the counter at each iteration.
- C_____ Write, compile, and run a Fortran90 program that uses an *incrementing* counter-controlled loop construct to count from 0 to 100 by 2's in an integer variable and print out the value of the counter at each iteration. *What is the value of the loop control variable upon exit from the loop?*
- B_____ Write, compile, and run a Fortran90 program that uses a *decrementing* counter-controlled loop construct to count backward from 200 to 100 by 10's in integer arithmetic and print out the value of the counter at each iteration. *What is the value of the loop control variable upon exit from the loop?*
- B_____ Write, compile, and run a Fortran90 program that counts from 1 to 100 in integer arithmetic and prints out the value of the counter at every iteration *except 27*.
- A_____ Enter and compile the program on the reverse side, which reads n and computes the first n Fibonacci numbers.
- A_____ Run program FIBONACCI using $n = 30$ and describe what happens. Then run program FIBONACCI using $n = 50$ and describe what happens.
- A+_____ Explain in some detail what went wrong for $n = 50$.

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PROGRAM fibonacci
!
!%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
!
! Outputs the first n Fibonacci numbers, where n is
! an integer input value
!
! Author: Dr. Dave Pruett
!         JMU Math
! Credits: None
!
!%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
!
      IMPLICIT NONE
      INTEGER :: fibo_number, previous1=1, previous2=0, i, n
!
! input the number n
!
      WRITE (*,*) 'enter the number n of Fibonacci ', &
                'numbers to print out '
      READ (*,*) n
!
! write the first two Fibonacci numbers outside the loop
!
      WRITE (*,*) 1, previous2      ! first Fibonacci number
      WRITE (*,*) 2, previous1      ! second Fibonacci number
!
! write the next n-2 Fibonacci numbers
!
      DO i = 3,n ! NOTE: counter i is passive except at exit

          fibo_number = previous2 + previous1
          WRITE (*,*) i, fibo_number
          previous2 = previous1      ! shift operations
          previous1 = fibo_number    ! CAUTION: order is crucial

      END DO

      STOP

END PROGRAM fibonacci

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