Travis Howe and Todd Wight gave a small presentation on FORTRAN in the Computation Seminar. Below are the files we used in the presentation. The website where we got most of the materials is http://www.cs.mtu.edu/shene/COURSES/cs201/NOTES/fortran.html.

We have modified some of the files that can be found there, and they are found below. (One of the major modifications includes more comments.) We then created a file of our own. We hope that any beginner will find the inner drive and high self-esteem needed to find success.

Also, consider the lilies. And while you’re doing that, we’ll be over here, going through your stuff.

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! ------------------------------------------------------- !
Computes arithmetic, geometric and harmonic means !
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! Anything written after the ! symbol is comments and is disregarded

PROGRAM ComputeMeans ! Every program must begin with PROGRAM
                     ! PROGRAMNAME
                     IMPLICIT NONE ! Implicit none should also always be there.

! Now we can start with the body of the execution part of the program. Subprograms can also ! be included. ! If you values to something in the program, you must declare them first.

REAL :: X = 1.0, Y = 2.0, Z = 3.0
REAL :: ArithMean, GeoMean, HarmMean
CHARACTER(LEN = 10) :: City = 'Provo', Ownership = 'Travis''s', Car = "Todd's"

WRITE(*,*) 'Data items: ', X, Y, Z
WRITE(*,*)
ArithMean = (X + Y + Z)/3.0
GeoMean = (X * Y * Z)**(1.0/3.0)
HarmMean = 3.0/(1.0/X + 1.0/Y + 1.0/Z)

WRITE(*,*) 'Arithmetic mean = ', ArithMean
WRITE(*,*) 'Geometric mean = ', GeoMean
WRITE(*,*) 'Harmonic Mean = ', HarmMean
WRITE(*,*)
WRITE(*,*) City, Ownership ! Print multiple variables. must have comma
WRITE(*,*) Car ! eat it, jeff

END PROGRAM ComputeMeans ! Always end with END PROGRAM
                     ! PROGRAMNAME
```
Given $t$, the time since launch, $u$, the launch velocity, $a$, the initial angle of launch (in degree), and $g$, the acceleration due to gravity, this program computes the position ($x$ and $y$ coordinates) and the velocity (magnitude and direction) of a projectile.

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PROGRAM Projectile
IMPLICIT NONE

REAL, PARAMETER :: g = 9.8 ! acceleration due to gravity
REAL, PARAMETER :: PI = 3.1415926 ! you knew this. didn’t you

REAL :: Angle ! launch angle in degree
REAL :: Time ! time to flight
REAL :: Theta ! direction at time in degree
REAL :: U ! launch velocity
REAL :: V ! resultant velocity
REAL :: Vx ! horizontal velocity
REAL :: Vy ! vertical velocity
REAL :: X ! horizontal displacement
REAL :: Y ! vertical displacement

READ(*,*) Angle, Time, U

Angle = Angle * PI / 180.0 ! convert to radian
X = U * COS(Angle) * Time
Y = U * SIN(Angle) * Time - g*Time*Time / 2.0
Vx = U * COS(Angle)
Vy = U * SIN(Angle) - g * Time
V = SQRT(Vx*Vx + Vy*Vy)
Theta = ATAN(Vx/Vy) * 180.0 / PI

WRITE(*,*) 'Horizontal displacement : ', X
WRITE(*,*) 'Vertical displacement : ', Y
WRITE(*,*) 'Resultant velocity : ', V
WRITE(*,*) 'Direction (in degree) : ', Theta

END PROGRAM Projectile
This program illustrates the following points: 

1. The exponential trap: 
   That is, $A^{B^C}$ is equal to $A^{(B^C)}$ rather than $(A^B)^C$. 
2. The integer division trap: 
   That is, $4/6$ is ZERO in Fortran rather than a real number $0.666666$. 
   Function REAL() is used to illustrate the differences. 
3. The string truncation trap: 
   What if the length assigned to a CHARACTER is shorter than the length of the string you expect the identifier to have? The third part shows you the effect.

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| Lines that begin with '!' are comment lines. |

PROGRAM Fortran_Traps ! Every program starts like this.  
Fortran_Traps  
   IMPLICIT NONE ! is the program name. The next line must say IMPLICIT NONE. Who knows why. 

   ! When you declare a variable as a parameter, you can't change its value later. 
   INTEGER, PARAMETER :: A = 2, B = 2, H = 3  
   INTEGER, PARAMETER :: O = 4, P = 6  
   CHARACTER(LEN=5), PARAMETER :: M = 'Smith', N = 'TEXAS'  
   CHARACTER(LEN=4), PARAMETER :: X = 'Smith'  
   CHARACTER(LEN=6), PARAMETER :: Y = 'TEXAS' 

   ! The exponential trap! WRITE(*,*) is how you print stuff out in FORTRAN. 
   WRITE(*,*) "First, the exponential trap:"  
   WRITE(*,*) A, ** B, ** H, ' = ', A**B**H  
   WRITE(*,*) '( ', A, ' ** ', B, ' ) **', H, ' = ', (A**B)**H  
   WRITE(*,*) A, ** ( ', B, ' ** ', H, ' ) = ', A**(B**H)  
   WRITE(*,*),  

   ! The integer division trap. Intrinsic function REAL() converts an integer to a real number. 
   WRITE(*,*) "Second, the integer division trap:"  
   WRITE(*,*) O, / ', P, ' = ', O/P  
   WRITE(*,*) 'REAL(', O, ', ') / ', P, ' = ', REAL(O)/P  
   WRITE(*,*) O, / REAL(' ', P, ') = ', O/REAL(P)  
   WRITE(*,*),  

   ! The string truncation trap 
   WRITE(*,*) "Third, the string truncation trap:"  
   WRITE(*,*) 'IS ', M, STILL IN ', N, '?'  
   WRITE(*,*) 'IS ', X, STILL IN ', Y, '?' 

END PROGRAM Fortran_Traps
Calculate the length of a parabola given height and base.  

PROGRAM ParabolaLength  
IMPLICIT NONE  

REAL :: Height, Base, Length  
REAL :: temp, t  

WRITE(*,*) 'Height of a parabola : '  
READ(*,*) Height  

WRITE(*,*) 'Base of a parabola : '  
READ(*,*) Base  

! ... temp and t are two temporary variables  

  t = 2.0 * Height  
  temp = SQRT(t**2 + Base**2)  
  Length = temp + Base**2/t*LOG((t + temp)/Base)  

WRITE(*,*)  
WRITE(*,*) 'Height = ', Height  
WRITE(*,*) 'Base = ', Base  
WRITE(*,*) 'Length = ', Length  

END PROGRAM ParabolaLength
Ax^2 + Bx + C = 0 given B*B-4*A*C >= 0

PROGRAM QuadraticEquation
  IMPLICIT NONE
  REAL :: a, b, c
  COMPLEX :: d
  COMPLEX :: root1, root2

  ! read in the coefficients a, b and c ! READ(*,*) requires user input.
  WRITE(*,*) 'A, B, C Please : '
  READ(*,*) a, b, c

  ! compute the square root of discriminant d
  d = b*b - 4.0*a*c
  d = SQRT(d)

  ! solve the equation
  root1 = (-b + d)/(2.0*a) ! first root
  root2 = (-b - d)/(2.0*a) ! second root

  ! display the results
  WRITE(*,*)
  WRITE(*,*) 'Roots are ', root1, ' and ', root2
END PROGRAM QuadraticEquation
PROGRAM love
IMPLICIT NONE

CHARACTER(LEN=15) :: name, clothes, Xo, hobby
REAL :: fav_num, z

WRITE(*,*) "Give me a hobby and some clothes:"
READ(*,*) hobby, clothes

WRITE(*,*) "Can you guess who this is yet?"

WRITE(*,*) "What is your favorite number?"
READ(*,*) fav_num
WRITE(*,*)
WRITE(*,*) "Based on the information given, MY initial guess is: "
WRITE(*,*)

IF (fav_num == 7) THEN ! Put () around the thing you’re iffing
    z = fav_num**(1.0/3.0) ! If you wanna put non-integer expoents...
ELSE
    z = fav_num**2 ! Don’t forget the ** when exponentiating!!! ;)
END IF

WRITE(*,*) "Well, z is:", z, "So it must be ... JASON!!"
WRITE(*,*)
WRITE(*,*) "This answer was calculated using the Implicit"
WRITE(*,*) "function theorem and Newton’s Method. Because,"
WRITE(*,*) "we all know it’s ALL Newton’s method, right?"
WRITE(*,*)

END PROGRAM love