```
C       A       IIII   RRrrr.     FFFFFFFFF    o  o      IIII  L
C      A  A      II    R     R    F          O      O     II   L
C     A    A     II    R     R    F         O        O    II   L
C    AAAAAAAA    II    Rrrrr'     FFFFF     O        O    II   L
C    A      A    II    R    R     F         O        O    II   L
C    A      A    II    R     R    F          O      O     II   L
C    A      A   IIII   R     r    F            O o       IIII  LLLLLLLL
C  ------------------------------------------------------------------
      program Airfoil
      implicit none
      character*20 fname
      character*1 batch, fopt, ans
      character*72 descr
      integer j,im,ss,distopt,KODE,c
      real M,P,XX,I,T,L,A,r_le,a_te,CL,pi,tt,inp,x,xp,xf,xn,xm,xim,yc,yt
      real ck,em,f,fp,ep,Q,al,fim,b,a0,a1,a2,a3,a4,d1,d2,d3,K1,g,h
      real dt,d2t,dc,xc(121),xu(121),yu(121),xl(121),yl(121)
      common /equation/a0, a1, a2, a3, a4, d1, d2, d3
      common /global/M,P,XX,I,T,L,Xm,K1,A,g,h,ss,j
      common /distrb/fim,b,distopt,batch
C ---------------------------------------------------------------------
      data pi/3.14159265/
C     Define Constants for Blade Thickness
      data a0/1.4845/, a1/0.6300/, a2/1.7580/, a3/1.4215/, a4/0.5075/
      write(6,'(5x,A)')'-----------------------------------------------'
      write(6,99)
  99  format(5x,'Do you want to run Interactively or give input in an'
     1      /5x,'Input File [Refer to AirFoilGen.inp for Description'
     2      /5x,'y/Y: Interative'
     3      /5x,'n/N: Batch (Input from File named AirFoilGen.inp)')
      read(5,*) batch
      if(batch .eq. 'n' .or. batch .eq. 'N') then
       open(97,FILE='AirFoilGen.inp',STATUS='old',FORM='formatted',
     1     ACCESS='sequential')
       read(97, '(A)') descr
       read(97,*) inp, XX, I, T
       ss = inp
       read(97,*) ck
         j = ck
         if(j .eq. 1.0) then
         read(97,*) M, P
         elseif(j .eq. 2) then
         read(97,*) L, P
         elseif(j .eq. 3) then
         read(97,*) L, A, ans
         endif
       read(97,*) fim, distopt, b
       im = fim
       read(97,*) fopt
       close(97)
      else
C     Interactive Run: Ask user to select NACA digit series
       write(6,'(5x,A)')'-----------------------------------------------'
  100  write(6,101)
  101  format(5x,'Select NACA Profile Series:'/
     1       /5x,'1: < Standard > 4 Digit Series - NACA MPXX'
     2       /5x,'2: < Modified > 4 Digit Series - NACA MPXX-IT'
     3       /5x,'0: < Exit the program, take no further action! >')
       read(5,*) inp
       ss = inp
        if (ss .eq. 0) then
         write(6,'(5x,A)') 'You choose to exit, program terminated!'
         stop
```

```
       else if (ss .ne. 1 .and. ss .ne. 2) then
        write(6,102)
102     format(/9x,'INCORRECT VARIABLE, CHOOSE FROM OPTIONS GIVEN!')
        write(6,'(5x, A)') 'Input 1 or 2 or 0 from your keyboard:'
        read(5,*) inp
        ss = inp
          if (ss .eq. 0) then
           write(6,'(5x,A)') 'You choose to exit, program terminated!'
           stop
          else if (ss .ne. 1 .and. ss .ne. 2) then
           write(6,'(5x,A)') 'Wrong input twice, program terminated!'
           stop
          endif
       endif
C
      write(6,'(5x,A)')'-----------------------------------------------'
      XX = 0.12
      write(6,103)       !Ask user to specify MAX thickness
  103 format(5x,'Specify Maximum Thickness,  XX/C, in hundredth of',
     1       /5x,'Chord, C. e.g. XX/C for NACA 2412 is 12/100 = 0.12',
     2       /5x,'[EXIT: XX/C < 0.0 or XX/C > 1.0]')
        read(5,*) XX
      if (XX .lt. 0.0 .or. XX .gt. 1.0) then
      write(6,'(5x,A)') 'Wrong Input, Program Terminated!'
      stop
      endif
C
      if (ss .eq. 2) then
      write(6,'(5x,A)')'-----------------------------------------------'
      T = 0.50
      write(6,104)
  104 format(5x,'Chordwise Position of MAX Thickness: T [NACA MPXX-IT]'
     1       /5x,'T in in 1/10th of Chord. T/C for NACA 0012-45 is'
     2       /5x,'5/10 = 0.50  [EXIT: T < 0.0 or T > 1.0]')
        read(5,*) T
          if (T .lt. 0.0 .or. T .gt. 1.0) then
          write(6,'(5x,A)') 'Wrong Input, Program Terminated!'
          stop
          endif
C
      write(6,'(5x,A)')'-----------------------------------------------'
      I = 2.0
      write(6,105)
  105 format(5x,'Input leading edge parameter: I [NACA MPXX-IT].'
     1      /5x,'Choose values from [0 ~ 9]. Note that I = 6 makes'
     2      /5x,'it a Standard 4-digit Airfoil [Exit: I < 0 or I > 9]')
        read(5,*) I
          if (I .lt. 0 .or. I .gt. 9) then
          write(6,'(5x,A)') 'Wrong Input, Program Terminated!'
          stop
          endif
      endif
C
      ck = 1
      write(6,'(5x,A)')'-----------------------------------------------'
      write(6,107)   !User input to select camber distribution options
  107 format(5x,'1: NACA 4 Digit Series - NACA MPXX or NACA MPXX-IT'
     1       /5x,'2: NACA 5 Digit Series - NACA LP0XX'
     2       /5x,'3: NACA 6 & 6A  Series - NACA 6Z(a)-LXX'
     3       /5x,'Choose Camber Distribution Options:')
C
      read(5,*)ck    !Take user input as free-form (interger or real)
      j = ck         !Convert user input to INTEGER
```

```
      if (j .lt. 1.0 .or. j .gt. 3.0) then
      write(6,'(5x,a)') 'Wrong Input, Program Terminated!'
      stop
      endif
C
      M = 0.20
      write(6,'(5x,a)')'-----------------------------------------------'
      if (j .eq. 1) then      !NACA 4 digit camber line
      write(6,108)            !Input maximum camber
  108 format(5x,'Input MAX Value of Camber: M in <NACA MPXX>'
     1      /5x,'Here M is in 1/100th of Chord'
     2      /5x,'e.g. M/C for NACA 2412 profile is 0.02')
      read(5,*) M
C
      P = 0.30
      write(6,109)            !Input x/c position of maximum camber
  109 format(/5x,'Chordwise Position of Max Camber: P in <NACA MPXX>'
     1       /5x,'Here P is in 1/10th of Chord. For example, P/C for'
     2       /5x,'NACA 2412 profile is 0.40')
      read(5,*) P
      endif
C
      L = 0.20
      if (j .eq. 2) then  !NACA 5 digit camber line
      write(6,110)        !Input max camber
  110 format(/5x,'Input Max Camber: L in tenths of Chord <NACA LP0XX>'
     1      /5x,'(Design Lift COeff CL = 1.5 L)')
      read(5,*) L
C
      Xf  = 0.40          !Initialize Chordwise Position of MAX Camber
      Xm = Xf
      write(6,111)        !Input x/c position of max camber
  111 format(/5x,'Input position of MAX Camber:P <NACA LPQXX>'
     1       /5x,'Here P is in 1/10th of Chord & MAX Camber occurs at'
     2       /5x,'Xf = P/2')
      read(5,*) P
      endif
C
      if (j .eq. 3) then     ! NACA 6 & 6A Series
      write(6,112)
  112 format(/5x,'Designationof NACA 6-series has form NACA 65(3)-LXX'
     1      /5x,'6-Series Designation, 5-Chordwise position of MIN '
     2      /5x,'pressure in tenth of Chord behind L.E. for the basic'
     3      /5x,'symmetrical section at ZERO lift. 3-Range of lift'
     4      /5x,'coefficient (CL) in 1/10th above & below the design'
     5      /5x,'CL in which favourable pressure gradient exist on'
     6      /5x,'both surfaces. L- Design CL in tenths. XX-thickness'
     7      /5x,'Specify Design Lift Coefficient, L:')
C Ideal or Design Lift Coeff. is Lift Coeffcient at '0' angle-of-attack.
      read(5,*) L
C
      A = 1.0
      write(6,113)          !Input x/c constant loading position, a
  113 format(/5x,'Input X/C for constant loading, A. Note that A = 1.0'
     1      /5x,'refers to Uniform loading along the entire Chord.'
     2      /5x,'A = 0.8 is for 6A-series Airfoil')
      read(5,*) A
C
      ans = 'N'
        if(abs(a - 0.8) .lt. 0.0001)  then
        write(6,114)        !Establish if this is an A series camber line
  114   format(/5x,'Do you wand to generate 6A-series Airfoil? (Y/N):')
        read(5,'(a)') ans
```

```
        endif
       endif
      endif
C
      call outdst(im,xc)
C
      write(6,'(5x,A)') '-------------------------------------------------'
      call PROFILE(x,yt,dt,d2t,yc,dc,xu(1),yu(1),xl(1),yl(1),ans)
      write(6,106) r_le,a_te
  106 format(5x,'Leading Edge Radius, rle/C = ',f7.5/
     1       /5x,'Trailing Edge Angle is',f6.2,' degrees'
     2       /5x,'[this is the TOTAL included angle]')
C
      write(6,201)
  201 format(/2x,' i     XU/C     YU/C      XL/C      YL/C       YT')
      write(6,*)'-----------------------------------------------------'
C
      do c = 1,im
      x = xc(c)
      call PROFILE(x,yt,dt,d2t,yc,dc,xu(c),yu(c),xl(c),yl(c),ans)
      if(dt .gt. 100.0) dt = 99.9999
      write(6,202) c,xu(c),yu(c),xl(c),yl(c),yt
  202 format(1x,i3,6f10.5)
      enddo
C
      write(6,*)'-----------------------------------------------------'
      write(6,203)
  203 format(2x,' i     XU/C     YU/C      XL/C      YL/C       YT')
C
      if(batch .eq. 'y' .or. batch .eq. 'Y') then
       write(6,204)
 204   format(/2x,'Do you want to save output to a file? (Y/N):'/)
       read(5,'(a)') fopt
       if(fopt .EQ. 'Y' .or. fopt .EQ. 'y') then
        call FILENAME(ss, j, fname)
        open(unit = 2, file = fname, status = 'new', iostat = KODE)
         if(KODE .eq. 0) then
          xim = im
          write(2,208) xim,xim
 208      format(2f10.6)
          write(2,209)
 209      format(2x,'Upper Surface')
            do c = 1,im
            write(2,210) xu(c),yu(c), 0.000
 210        format(3f10.6)
            enddo
C
          write(2,211)
 211      format(2x,'Lower Surface')
            do c = 1,im
            write(2,212) xl(c),yl(c), 0.000
 212        format(3f10.6)
            enddo
          close(2)
          write(6,*)'Profile Data Written to File ', fname
         else
          write(6,*)'File Already Exists, No Output Written to the File'
         endif
       endif
      endif
      stop
      end
C ---------------------------------------------------------------------
```