C:\Users\edward\Dropbox\Delphi Graad 11 2012\00 Delphi is gr8! @ Grade 11 Solutions\Chapter 8 Subroutines and Methods\Activity 4\Act 4.2 ID numbers check valid\frmIDs_u.pas

```pascal
unit frmIDs_u;

interface

uses
  Windows, Messages, SysUtils, Variants, Classes, Graphics, Controls, Forms,
  Dialogs, StdCtrls, ComCtrls;

type
  TfrmID = class(TForm)
    edtID: TEdit;
    lblEnter: TLabel;
    redOut: TRichEdit;
    btnAnalyse: TButton;
    procedure btnAnalyseClick(Sender: TObject);
    procedure edtIDExit(Sender: TObject);
  private
    sID : string ;
    function IsValidID : boolean ;
    function Age : integer ;
    function Gender : string ;
    function Citizen : string ;
    function Birthdate : string ;
  public
    { Public declarations }
  end;

var
  frmID: TfrmID;

implementation

{$R *.dfm}

function TfrmID.Age: integer;
var
  iDay, iMonth, iYear, iAge : integer ;
  iToday, iThisMonth, iThisYear : integer ;
  sYear, sToday : string ;
begin
  //obtain the birthday, montha and year from the ID
  iDay := StrToInt(copy(sID, 5, 2)) ;
  iMonth :=  StrToInt(copy(sID, 3, 2)) ;
  sYear := copy(sID, 1, 2) ;
  if StrToInt(sYear) IN [0..12] then
    iYear := 2000 + StrToInt(sYear)
  else
    iYear := 1900 + StrToInt(sYear);
  //determine today's date
  sToday := DateToStr(Date) ;
  iToday := StrToInt(copy(sToday, 1, 2)) ;
  iThisMonth := StrToInt(copy(sToday,4,2)) ;
  iThisYear := StrToINt(copy(sToday, 7,4)) ;
  //calculate the age the person will become this year
  iAge := iThisYear - iYear ;
  //determine if the person has already had his/her birthday
  if iMonth > iThisMonth then //the birthday will only be later in the year
    dec(iAge)
  else
    if iMonth = iThisMonth then //test if the birthday is later in the month
      if iDay > iToday then //the birthday will only be later in the month
        dec(iAge) ;
  Result := iAge ;
end;

function TfrmID.Birthdate: string;
var
  sDay, sMonth, sYear : string ;
begin
  sDay := copy(sId, 5, 2) ;
  sMonth :=  LongMonthNames[StrToInt(copy(sID, 3, 2))] ;
  sYear := copy(sID, 1, 2) ;
  if StrToInt(sYear) IN [0..12] then
```

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      Result := sDay + ' ' + sMonth + ' ' + '20' + sYear
    else
      Result := sDay + ' ' + sMonth + ' ' + '19' + sYear ;
end;

procedure TfrmID.btnAnalyseClick(Sender: TObject);
begin
  redOut.Clear ;
  if IsValidID then
    begin
      redOut.Lines.Add('Gender: '+ Gender) ;
      redOut.Lines.Add('Age: ' + IntToStr(Age)) ;
      redOut.Lines.Add('Citizenship: ' + Citizen) ;
      redOut.Lines.Add('Birth date: ' + Birthdate) ;
    end
  else
    begin
      redOut.Lines.Add('This ID is not valid') ;
      edtID.SetFocus ;
    end ;
end;

function TfrmID.Citizen: string;
begin
  if sID[11] = '0' then
    Result := 'South African'
  else
    Result := 'Other' ;
end;

procedure TfrmID.edtIDExit(Sender: TObject);
begin
  sId := edtID.Text ;
end;

function TfrmID.Gender: string;
begin
  if StrToInt(sID[7]) > 4 then
    Result := 'Male'
  else
    Result:= 'Female' ;
end;

function TfrmID.IsValidID: boolean;
var
  i, iSumOdds, iSumEvens, iTotal, iCheck : integer ;
  sEvens, sNumFromEvens : string ;
begin
  if length(sID) <> 13 then
    begin
      Result := false ;
      exit ;
    end;
  //Calculate the sum of all the odd digits in the ID number  -excluding the last digit
  i := 1 ;
  iSumOdds := 0 ;
  while i <= 11 do
    begin
      iSumOdds := iSumOdds + StrToInt(sID[i]) ;
      inc(i, 2) ;
    end ;

  //Create a new number: Move the even positions into a field and multiply the number by 2.
  sEvens := '' ;
  i := 2 ;
  while i <= 12 do
    begin
      sEvens := sEvens + sID[i] ;
      inc(i, 2) ;
    end;
  sNumFromEvens := IntToStr(StrToInt(sEvens) * 2) ;

  //Add up all the digits in this new number
  iSumEvens := 0 ;
  for i := 1 to length(sNumFromEvens) do
    iSumEvens := iSumEvens + StrToInt(sNumFromEvens[i]) ;
```

```
  //Add the two numbers
  iTotal :=  iSumOdds + iSumEvens ;

  //Subtract the second digit from 10
  iCheck := (iTotal MOD 10) ;
  if iCheck = 0 then
    iCheck := 10 ;
  iCheck := 10 - iCheck ;

  //Check if it is the same as the last digit of the ID
  Result := iCheck = StrToInt(sID[13]) ;
end;

end.
```