Province of the
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EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
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Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2026

INFORMATION TECHNOLOGY P1 MARKING GUIDELINE

MARKS: **150**

TIME: **3 hours**

This marking guideline consists of 22 pages.

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NAME OF LEARNER:				
TOTAL QUESTION 1	**TOTAL QUESTION 2**	**TOTAL QUESTION 3**	**TOTAL QUESTION 4**	**TOTAL**
/35	**/40**	**/45**	**/30**	**/150**

	QUESTION 1	MAX MARK	MARKS ACHIEVED
1.1	**BUTTON: [Q1.1 – Blue LED Pioneer]** Display in lblOutput: "Shuji Nakamura" "Blue LED Pioneer" ✓ Correct use of a new line (#13, #10, sLineBreak or equivalent) ✓ Label Font size set to 16 ✓ Label Font style set to Bold ✓ Label Font colour set to Blue ✓ Panel colour changed to White ✓	**6**	
1.2	**BUTTON: [Q1.2 – LED Lifespan]** Retrieve hours ✓ Correct formula ✓ Store result in real variable ✓ Output to label ✓ Correct hours displayed ✓ converted to string✓ Correct years displayed ✓ formatted to 2 decimal places ✓	**8**	
1.3	**BUTTON: [Q1.3 – LED Material Analysis]** Retrieve material code from edtMaterial ✓ Initialise counter and loop variables ✓✓ Correct loop structure ✓✓ Detect and process "Ga" ✓✓ Detect and process "As" ✓ Detect and process "P" ✓ Detect and process "N" ✓ Increment counter correctly ✓ Display number of elements identified ✓ Determine LED colour correctly ✓✓ Display LED colour ✓	**15**	

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1.4	**BUTTON: [Q1.4 – Colour Sequence]** Retrieve sequence from edit box ✓ Initialise position counter ✓ Enable timer ✓ Determine colour from current character ✓ Increment position correctly ✓ Stop timer at end of sequence ✓	**6**	
	QUESTION 1 TOTAL	**35**	

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QUESTION 2		MAX MARK	MARKS ACHIEVED
2.1.1	**Button [Q2.1.1]** 'SELECT LEDName, Colour, LifespanHours FROM tblLEDTypes ORDER BY LifespanHours DESC' SELECT correct fields ✓ FROM correct table ✓ ORDER BY correct field ✓ DESC ✓	**4**	
2.1.2	**Button [Q2.1.2]** 'SELECT * FROM tblLEDTypes WHERE LEDName Like "%Blue%"' SELECT all fields ✓ FROM correct table ✓ WHERE correct field ✓ LIKE Blue ✓	**4**	
2.1.3	**Button [Q2.1.3]** SELECT LEDName, ForwardVoltage, CurrentmA, ForwardVoltage * CurrentmA AS [PowerMilliWatts] FROM tblLEDTypes' SELECT correct fields ✓ correct calculation: ForwardVoltage✓ * CurrentmA ✓ correct alias ✓ FROM correct table ✓	**5**	
2.1.4	**Button [Q2.1.4]** 'INSERT INTO tblLEDTypes VALUES ("QuantumBlue", "Blue", "GaN", 3.4, 25, 500, 75000, 10)' INSERT INTO correct table ✓ VALUES ✓ correct fields ✓ String must have " ", Integers must not have " "✓	**4**	
2.1.5	**Button [Q2.1.5]** 'SELECT ManufacturerName, Count(LEDID) AS NumberOfLEDs FROM tblManufacturers, tblLEDTypes WHERE tblManufacturers.ManufacturerID = tblLEDTypes.ManufacturerID GROUP BY ManufacturerName HAVING Count(LEDID) >= 2 ORDER BY ManufacturerName' SELECT correct field ✓, count (correct field) ✓ AS alias name ✓ FROM correct tables ✓ WHERE tables linked by ManufacturerID ✓ GROUP BY correct field ✓ HAVING count (correct field) >= 2 ✓ ORDER BY ManufacturerName ✓ *HAVING either version (with alias name or full expression)	**8**	

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2.2.1	**Button [Q2.2.1 – Increase Brightness]** Loop through tblLEDTypes ✓ Identify Blue LEDs ✓ Edit ✓ BrightnessLumens := BrightnessLumens + 50 ✓ Post changes ✓ Add LEDName to the RichEdit ✓ Display total number of records updated ✓	**7**	
2.2.2	**Button [Q2.2.2 – Obsolete LEDs]** Initialise counter ✓ Loop through tblLEDTypes ✓ Identify obsolete LEDs ✓ Increase counter ✓ Add LEDName to the RichEdit ✓ Delete record ✓ Correct record navigation after Delete ✓ *(Else Next)* Display total number of records deleted ✓	**8**	
	QUESTION 2 TOTAL	**40**	

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QUESTION 3		MAX MARK	MARKS ACHIEVED
3.1.1	**Constructor Create** Constructor heading with correct parameters ✓ Correct parameter data types ✓ Assign parameters to attributes ✓✓	**4**	
3.1.2	**Accessor Method – getApplication** Function heading with String value as return data type ✓ Determine application description using appropriate selection structure ✓ Return the correct application description ✓	**3**	
3.1.3	**Mutator Method – setApplication** Procedure heading with Integer parameter value ✓ Assign parameter to fApplication ✓	**2**	

3.1.4	**Auxiliary Method - calcSuitability**
	
	Function heading with String return data type ✓
	
	If ColourTemperature < 3500 ✓
	  Recommendation = Relaxation ✓
	If ColourTemperature < 5000 ✓
	  Recommendation = General Purpose ✓
	else Recommendation = Productivity ✓
	
	Return suitability message using the application description ✓
		7	

3.1.5	**Accessor Method – isCommercial** Function heading with Boolean return data type ✓ Correct Boolean result returned ✓	**2**	
3.1.6	**ToString Method** Function heading with String value as return data type ✓ Build a string with correct labels, attributes, tab spacing ✓ Return the String ✓	**3**	
	Subtotal: Object class	**[21]**	

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3.2.1	**Button [3.2.1 – Load Lighting Profile]** Extract the light profile from the combo box ✓ Remove spaces using Pos and Delete ✓ inside a loop ✓ Assign File ✓ Test to see if the text file exists ✓ If the text file cannot be found, display a suitable message ✓ Loop through the text file ✓ ○ Read line ✓ ○ Search for the correct light profile. ✓ ○ If the matching lighting profile is found, use string handling methods✓ to correctly separate data ✓ ○ Instantiate the new LED light object. objLEDLight ✓ := TLighting.Create (correct parameters) ✓ Close the file ✓	**14**	
3.2.2	**Button [3.2.2 – Display Lighting Analysis]** Display object using **toString** method ✓ Display suitability recommendation ✓ if ✓ lighting is commercial by calling the isCommercial method ✓ Display Yes ✓ Else ✓ Display No ✓	**7**	
3.2.3	**Button [3.2.3 – Update Application]** Convert input to Integer ✓ Call mutator method ✓ (correct parameters) ✓	**3**	
	Subtotal: Main unit	**[24]**	
	QUESTION 3 TOTAL	**45**	

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QUESTION 4		MAX MARK	MARKS ACHIEVED
4.1	**Button [4.1 – Populate LED Matrix]** Outer loop ✓ Inner loop ✓ Get character from arrFlag ✓ and assign to ar2Flag ✓ Ignore spaces – any method that works correctly ✓✓	**6**	
4.2	**Button [4.2 – Display Flag]** Outer loop ✓ Initialise string variable ✓ Inner loop ✓ Build output string ✓using a2Flag ✓ add a space ✓ Display each row ✓ in RichEdit ✓	**8**	
4.3	**Button [4.3 – Count LED Colours]** Outer Loop ✓ Inner Loop ✓ Use If/Case ✓ Identify colours correctly ✓ Add to colour counters ✓ Display results ✓	**6**	
4.4	**Button [4.4 – Dominant Colour]** Initialise maximum value and colour ✓ Compare Blue count ✓ Compare Green count ✓ Compare White count ✓ Compare Yellow count ✓ Compare Black count ✓ Update maximum value correctly ✓and store the maximum colour ✓ Display dominant colour✓ and count ✓	**10**	
	QUESTION 4 TOTAL	**30**	

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SAMPLE SOLUTIONS

QUESTION 1

////////// 35 Marks //////////

```
// ============================================================
//              Question 1.1 - 6 Marks
// ============================================================
procedure TfrmQuestion1.btn1_1Click(Sender: TObject);
begin
  /// Enter your code below ///
  lblOutput.Caption := 'Shuji Nakamura' + #13 + 'Blue LED Pioneer';

  lblOutput.Font.Size := 16;
  lblOutput.Font.Style := [fsBold];
  lblOutput.Font.Color := clBlue;

  lblOutput.Alignment := taCenter;
  pnlOutput.Color := clWhite;
end;

// ============================================================
//              Question 1.2 - 8 Marks
// ============================================================
procedure TfrmQuestion1.btn1_2Click(Sender: TObject);
var
  rLifespan : Real;
  iHours    : Integer;
begin
  /// Enter your code below ///
  iHours    := spnHoursPerDay.Value;
  rLifespan := 50000 / (iHours * 365);
  lbl1_2.Caption := 'Lifespan: ' + #13#13 +
                    'An LED used for ' + IntToStr(iHours) +
                    ' hours per day will last approximately ' +
                    FloatToStrF(rLifeSpan, ffFixed, 6, 2) +
                    ' years. ';
end;

// ============================================================
//              Question 1.3 - 15 Marks
// ============================================================
procedure TfrmQuestion1.btn1_3Click(Sender: TObject);
var
  sMaterial, sColour : String;
  iPos, iCount : Integer;
begin
  /// Enter your code below ///
  sMaterial := edtMaterial.Text;

  red1_3.Clear;
```

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```
 iPos := 1;


iCount := 0;

 while iPos <= Length(sMaterial) do
  begin
  // Two-character symbols
  if Copy(sMaterial, iPos, 2) = 'Ga' then
    begin
      red1_3.Lines.Add('Gallium');
      Inc(iCount);
      Inc(iPos, 2);
    end
    else if Copy(sMaterial, iPos, 2) = 'As' then
      begin
        red1_3.Lines.Add('Arsenic');
        Inc(iCount);
        Inc(iPos, 2);
      end

    // One-character symbols
      else if sMaterial[iPos] = 'P' then
        begin
          red1_3.Lines.Add('Phosphorus');
          Inc(iCount);
          Inc(iPos);
        end
        else if sMaterial[iPos] = 'N' then
          begin
            red1_3.Lines.Add('Nitrogen');
            Inc(iCount);
            Inc(iPos);
          end
          else
            Inc(iPos);
 end;

 // Determine LED colour
 if sMaterial = 'GaAsP' then
   sColour := 'Red'
 else if sMaterial = 'GaP' then
   sColour := 'Green'
   else if sMaterial = 'GaN' then
     sColour := 'Blue'
     else
     sColour := 'Unknown';

 red1_3.Lines.Add(#13 + 'Number of elements: ' + IntToStr(iCount) + #13 +
                  'LED Colour: ' + sColour);
end;
```

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```
// ============================================================
//              Question 1.4 - 6 Marks
// ============================================================
procedure TfrmQuestion1.btn1_4Click(Sender: TObject);
begin
  /// Enter your code below ///
  sSequence := edtSequence.Text;
  iPos := 0;
  tmrLED.Enabled := True;
end;

procedure TfrmQuestion1.tmrLEDTimer(Sender: TObject);
begin
  /// Enter your code below ///
  Inc(iPos);
  if iPos >= Length(sSequence) then
    tmrLED.Enabled := False;

  case sSequence[iPos] of
    'R': shpLEDLight.Brush.Color := clRed;
    'G': shpLEDLight.Brush.Color := clGreen;
    'B': shpLEDLight.Brush.Color := clBlue;
  end;
end;
```

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QUESTION 2

////////// 40 marks //////////

```
// ============================================================
//              Question 2.1.1 - 4 Marks
// ============================================================
procedure TfrmQuestion2.btn2_1_1Click(Sender: TObject);
// Provided code - DO NOT DELETE OR ALTER //
var
  sSQL1: String;
begin
  /// Enter your code below ///
  sSQL1 := 'SELECT LEDName, Colour, LifespanHours ' +
           'FROM tblLEDTypes ' +
           'ORDER BY LifespanHours DESC';

  // Provided code - DO NOT DELETE OR ALTER //
  dbCONN.runSQL(sSQL1);
  if length(sSQL1) <> 0 then
    SetGridColumnWidths(dbgSQL);
end;

// ============================================================
//              Question 2.1.2 - 4 Marks
// ============================================================
procedure TfrmQuestion2.btn2_1_2Click(Sender: TObject);
// Provided code - DO NOT DELETE OR ALTER //
var
   sSQL2: String;
begin
  /// Enter your code below ///
  sSQL2 := 'SELECT * ' +
           'FROM tblLEDTypes ' +
           'WHERE LEDName LIKE "%Blue%"';

  // Provided code - DO NOT DELETE OR ALTER //
  dbCONN.runSQL(sSQL2);
  if length(sSQL2) <> 0 then
    SetGridColumnWidths(dbgSQL);
end;
```

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```
// ============================================================
//              Question 2.1.3 - 5 Marks
// ============================================================
procedure TfrmQuestion2.btn2_1_3Click(Sender: TObject);
// Provided code - DO NOT DELETE OR ALTER //
var
  sSQL3 : String;
begin
  /// Enter your code below ///
  sSQL3 := 'SELECT LEDName, ForwardVoltage, CurrentmA, ' +
           'ForwardVoltage * CurrentmA AS [PowerMilliWatts] ' +
           'FROM tblLEDTypes';

  // Provided code - DO NOT DELETE OR ALTER //
  dbCONN.runSQL(sSQL3);
  if length(sSQL3) <> 0 then
    SetGridColumnWidths(dbgSQL);
end;

// ============================================================
//              Question 2.1.4 - 4 Marks
// ============================================================
procedure TfrmQuestion2.btn2_1_4Click(Sender: TObject);
// Provided code - DO NOT DELETE OR ALTER //
var
  sSQL4: String;
begin
  /// Enter your code below ///
  sSQL4 := 'INSERT INTO tblLEDTypes ' +
           '(LEDName, Colour, MaterialCode, ForwardVoltage, CurrentmA, ' +
           'BrightnessLumens, LifespanHours, ManufacturerID) ' +
           'VALUES ' +
           '("QuantumBlue", "Blue", "GaN", 3.4, 25, 500, 75000, 10)' ;

  // Provided code - DO NOT DELETE OR ALTER //
  dbCONN.executeSQL(sSQL4,dbgManufacturers,dbgLEDTypes,dbgSQL);
  if length(sSQL4) <> 0 then
    SetGridColumnWidths(dbgSQL);
end;
```

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```
// ============================================================
//              Question 2.1.5 - 8 Marks
// ============================================================
procedure TfrmQuestion2.btn2_1_5Click(Sender: TObject);
// Provided code - DO NOT DELETE OR ALTER //
var
  sSQL5: String;
begin
  /// Enter your code below ///
  sSQL5 := 'SELECT ManufacturerName, ' +
           'Count(LEDID) AS NumberOfLEDs ' +
           'FROM tblManufacturers, tblLEDTypes ' +
           'WHERE tblManufacturers.ManufacturerID = ' +
           'tblLEDTypes.ManufacturerID ' +
           'GROUP BY ManufacturerName ' +
           'HAVING Count(LEDID) >= 2 ' +
           'ORDER BY ManufacturerName';

  // Provided code - DO NOT DELETE OR ALTER //
  dbCONN.runSQL(sSQL5);
  if length(sSQL5) <> 0 then
    SetGridColumnWidths(dbgSQL);
end;
// ============================================================
//              Question 2.2.1 - 7 Marks
// ============================================================
procedure TfrmQuestion2.btn2_2_1Click(Sender: TObject);
var
  iCount : Integer;
begin
  // Provided code - DO NOT DELETE OR ALTER //
  redOutput.Clear;
  redOutput.Lines.Add('The following LEDs were updated:');
  redOutput.Lines.Add('');

  /// Enter your code below ///
  iCount := 0;
  tblLEDTypes.First;
  while NOT tblLEDTypes.Eof do
    begin
      if tblLEDTypes['Colour'] = 'Blue' then
        begin
          Inc(iCount);
          tblLEDTypes.Edit;
          tblLEDTypes['BrightnessLumens'] :=
          tblLEDTypes['BrightnessLumens'] + 50;
          tblLEDTypes.Post;
          redOutput.Lines.Add(tblLEDTypes['LEDName']);
        end;
      tblLEDTypes.Next;
    end;
  redOutput.Lines.Add('');
```

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```
 redOutput.Lines.Add(IntToStr(iCount) + ' record(s) updated.'); end;

// ============================================================
//              Question 2.2.2 - 8 Marks
// ============================================================
procedure TfrmQuestion2.btn2_2_2Click(Sender: TObject);
var
  iDeleted : Integer;
begin
  // Provided code - DO NOT DELETE OR ALTER //
  redOutput.Clear;
  redOutput.Lines.Add('The following LEDs were removed:');
  redOutput.Lines.Add('');

  /// Enter your code below ///
  iDeleted := 0;
  tblLEDTypes.First;
  while NOT tblLEDTypes.Eof do
    begin
      if tblLEDTypes['LifespanHours'] < 40000 then
        begin
          inc(iDeleted);
          redOutput.Lines.Add(tblLEDTypes['LEDName']);
          tblLEDTypes.Delete;
        end
      else
          tblLEDTypes.Next;
    end;
  redOutput.Lines.Add('');
  redOutput.Lines.Add(IntToStr(iDeleted) + ' record(s) deleted.');
end;
```

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QUESTION 3

////////// 45 Marks //////////

```
// ============================================================
//              Question 3.1.1 - 4 Marks
// ============================================================
constructor TLighting.Create(sName: String; iColourTemp, iBrightness,iApplication: Integer);
begin
  fName        := sName;
  fColourTemp  := iColourTemp;
  fBrightness  := iBrightness;
  fApplication := iApplication;
end;

// ============================================================
//              Question 3.1.2 - 3 Marks
// ============================================================
function TLighting.getApplication: String;
begin
  case fApplication of
    1 : Result := 'Decorative';
    2 : Result := 'Residential';
    3 : Result := 'Hospitality';
    4 : Result := 'Office';
    5 : Result := 'Education';
    6 : Result := 'Retail';
    7 : Result := 'Healthcare';
    8 : Result := 'Industrial';
    9 : Result := 'Warehouse';
    10: Result := 'Security Lighting';
    11: Result := 'Specialised Lighting';
  else
    Result := 'Unknown';
  end;
end;

// ============================================================
//              Question 3.1.3 - 2 Marks
// ============================================================
procedure TLighting.setApplication(iNewApplication: Integer);
begin
  fApplication := iNewApplication;
end;
```

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```
// ============================================================
//              Question 3.1.4 - 7 Marks
// ============================================================
function TLighting.calcSuitability: String;
var
  sRecommendation : String;
begin
  if fColourTemp < 3500 then
    sRecommendation := 'Relaxation'
  else
    if fColourTemp < 5000 then
      sRecommendation := 'General Purpose'
    else
      sRecommendation := 'Productivity';

  Result := sRecommendation + ' lighting suitable for ' +
            getApplication + ' environments.';
end;

// ============================================================
//              Question 3.1.5 - 2 Marks
// ============================================================
function TLighting.isCommercial: Boolean;
begin
  Result := False;
  if fApplication IN [4..9] then
    Result := True;

  // OR
    //  case fApplication of
    //    4..9 : Result := True;
    //  else
    //    Result := False;
    //  end;
end;

// ============================================================
//              Question 3.1.6 - 3 Marks
// ============================================================
function TLighting.ToString: String;
begin
  Result := 'Lighting Name:' + #9 + fName + #13 +
            'Colour Temperature:' + #9 + IntToStr(fColourTemp) + #13 +
            'Brightness:' + #9 + IntToStr(fBrightness) + #13 +
            'Application:' + #9 + getApplication;
end;
```

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```
// ============================================================
//              Question 3.2.1 - 14 Marks
// ============================================================
procedure TfrmQuestion3.btn3_2_1Click(Sender: TObject);
var
  MyFile       : TextFile;
  sLine        : String;
  bFound       : Boolean;
  sName        : String;
  iPos         : Integer;
  iColourTemp  : Integer;
  iBrightness  : Integer;
  iApplication : Integer;

begin
  /// Enter your code below ///
  sName := cmbLighting.Items[cmbLighting.ItemIndex];

  while pos(' ', sName) > 0 do
    delete(sName, pos(' ', sName), 1);

  //OR
    //  repeat
    //    delete(sLine, pos(' ', sLine), 1);
    //  until pos(' ', sLine) = 0;

  AssignFile(MyFile,'LightingTemperatures.txt');
  try
    Reset(MyFile);
  except
    ShowMessage('File not found');
    Exit;
  end;

  bFound := False;
  while NOT eof(MyFile) AND (bFound = False) do
    begin
      ReadLn(MyFile,sLine);
      if pos(sName, sLine) = 1 then  // OR if copy(sLine,1,length(sName)) = sName then
        begin
          // Name
          iPos := pos(',', sLine);
          sName := copy(sLine,1,iPos-1);
          delete(sLine,1,iPos);
          // Colour Temperature
          iPos := Pos(',', sLine);
          iColourTemp := StrToInt(copy(sLine,1,iPos-1));
          delete(sLine,1,iPos);
          // Brightness
          iPos := Pos(',', sLine);
          iBrightness := StrToInt(copy(sLine,1,iPos-1));
          delete(sLine,1,iPos);
```


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```
 // Application
        iApplication := StrToInt(sLine);

        objLEDLight := TLighting.Create(sName, iColourTemp, iBrightness, iApplication);
        bFound := True;
      end;
    end;

  CloseFile(MyFile);

  // Provided code - DO NOT DELETE OR ALTER //
  btn3_2_2.Enabled := True;
end;

// ============================================================
//              Question 3.2.2 - 7 Marks
// ============================================================
procedure TfrmQuestion3.btn3_2_2Click(Sender: TObject);
begin
  /// Enter your code below ///
  redOutput.Clear;

  redOutput.Lines.Add(objLEDLight.ToString);
  redOutput.Lines.Add('');
  redOutput.Lines.Add('Recommendation:');
  redOutput.Lines.Add(objLEDLight.calcSuitability);
  redOutput.Lines.Add('');

  redOutput.Lines.Add('Commercial:');

  if objLEDLight.isCommercial then
    redOutput.Lines.Add('Yes')
  else
    redOutput.Lines.Add('No');

  // Provided code - DO NOT DELETE OR ALTER //
  btn3_2_3.Enabled := True;
end;

// ============================================================
//              Question 3.2.3 - 3 Marks
// ============================================================
procedure TfrmQuestion3.btn3_2_3Click(Sender: TObject);
var
  iApplication : Integer;
begin
  /// Enter your code below ///
  iApplication := StrToInt(edtApplication.Text);
  objLEDLight.setApplication(iApplication);

  // Provided code - DO NOT DELETE OR ALTER //
  btn3_2_2.Click;
end;
```

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QUESTION 4

////////// 30 Marks //////////

```
// ========================================================
//              Question 4.1 - 6 Marks
// ========================================================
procedure TfrmQuestion4.btn4_1Click(Sender: TObject);
var
  iRow, iCol : Integer;
  iPos : Integer;
begin
  /// Enter your code below ///
  for iRow := 1 to NUMROWS do
    begin
      iPos := 1;
      for iCol := 1 to NUMCOLS do
        begin
          ar2Flag[iRow,iCol] := arrFlag[iRow][iPos];
          inc(iPos,2); // Skip the spaces
        end;
    end;

  // Provided code - DO NOT DELETE OR ALTER //
  btn4_2.Enabled := True;
end;

// ========================================================
//              Question 4.2 - 8 Marks
// ========================================================
procedure TfrmQuestion4.btn4_2Click(Sender: TObject);
var
  iRow, iCol : Integer;
  sLine : String;
begin
  // Provided code - DO NOT DELETE OR ALTER //
  redOutput.Clear;
  redOutput.Lines.Add('SOUTH AFRICAN LED FLAG');
  redOutput.Lines.Add('');

  /// Enter your code below ///
  for iRow := 1 to NUMROWS do
    begin
      sLine := '';
      for iCol := 1 to NUMCOLS do
        sLine := sLine + ar2Flag[iRow,iCol] + ' ';
      redOutput.Lines.Add(sLine);
    end;

  // Provided code - DO NOT DELETE OR ALTER //
  btn4_3.Enabled := True;
end;
```

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```
// ============================================================
//              Question 4.3 - 6 Marks
// ============================================================
procedure TfrmQuestion4.btn4_3Click(Sender: TObject);
var
  iRow, iCol : Integer;

begin
  // Provided code - DO NOT DELETE OR ALTER //
  iRed    := 0;
  iBlue   := 0;
  iGreen  := 0;
  iWhite  := 0;
  iYellow := 0;
  iBlack  := 0;

  /// Enter your code below ///
  for iRow := 1 to NUMROWS do
    begin
      for iCol := 1 to NUMCOLS do
        case ar2Flag[iRow,iCol] of
          'R' : Inc(iRed);
          'B' : Inc(iBlue);
          'G' : Inc(iGreen);
          'W' : Inc(iWhite);
          'Y' : Inc(iYellow);
          'K' : Inc(iBlack);
        end;
    end;
  redOutput.Clear;
  redOutput.Lines.Add('Red LEDs: ' + IntToStr(iRed) + #13 +
                      'Blue LEDs: ' + IntToStr(iBlue) + #13 +
                      'Green LEDs: ' + IntToStr(iGreen) + #13 +
                      'White LEDs: ' + IntToStr(iWhite) + #13 +
                      'Yellow LEDs: ' + IntToStr(iYellow) + #13 +
                      'Black LEDs: ' + IntToStr(iBlack));

  // Provided code - DO NOT DELETE OR ALTER //
  btn4_4.Enabled := True;
end;
```

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```
// ============================================================
//              Question 4.4 - 10 Marks
// ============================================================
procedure TfrmQuestion4.btn4_4Click(Sender: TObject);
var
  sColour : String;
  iMax    : Integer;
begin
  // Provided code - DO NOT DELETE OR ALTER //
  redOutput.Clear;

  /// Enter your code below ///
  iMax := iRed;
  sColour := 'Red';

  if iBlue > iMax then
    begin
      iMax := iBlue;
      sColour := 'Blue';
    end;

  if iGreen > iMax then
    begin
      iMax := iGreen;
      sColour := 'Green';
    end;

  if iWhite > iMax then
    begin
      iMax := iWhite;
      sColour := 'White';
    end;

  if iYellow > iMax then
    begin
      iMax := iYellow;
      sColour := 'Yellow';
    end;

  if iBlack > iMax then
    begin
      iMax := iBlack;
      sColour := 'Black';
    end;

  redOutput.Lines.Add('Dominant Colour: ' + sColour + #13 +
                      'Number of LEDs: ' + IntToStr(iMax));
end;
```

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