CECS 524 Unit-11-Assignments

Scantron In Ada

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Source Code: IDE used is GNAT Studio

```
with Ada.Text_IO;

with Ada.Strings.Unbounded;

with Ada.Integer_Text_IO;

with Ada.Text_IO.Unbounded_IO;

with Ada.Float_Text_IO;

use Ada.Text_IO;


procedure main is



  --declaring the array type

  MembersMax : CONSTANT Positive := 150;

  SUBTYPE MyRange IS Positive RANGE 1..MembersMax;

  TYPE IntArray IS ARRAY(MyRange) of Integer;

  Frequency : ARRAY(1..150) of Integer := (others => 0);


  --declaring the variables

  Input : File_Type;

  file_name : Ada.Strings.Unbounded.Unbounded_String;

  Total_Question:Ada.Strings.Unbounded.Unbounded_String;

  answer: Ada.Strings.Unbounded.Unbounded_String;

  Answer_values:IntArray;

  Student_values:IntArray;
```

```
   Cost : Integer;
   count_num_of_questions : Integer;
   total_sum : Integer;
   total_Student : Integer;
   z123 : Integer;

   package Student_Type1 is

   private
     Type Student_Type1 is new Integer range 1 .. 1000;
     Type Student_Grade is new Integer range 1 .. 1000;

   end Student_Type1;

   --Creating records
   type Student_Type is record
      Student_ID   : Integer;
      Student_Grade : Integer;
   end record;

   -- Parse string into array.
   FUNCTION parseString ( str : Ada.Strings.Unbounded.Unbounded_String ; Len : Integer) RETURN
IntArray IS
   st      : String   := Ada.Strings.Unbounded.to_string(str);
   current : Positive := st'First;
   L       : Positive := 1;
   Numbers : IntArray;

   begin
```

```
  for i in st'range loop
    if st (i) = ' ' then
      Numbers(L) := Integer'Value(st (current .. i-1));
      L := L + 1;
      current := i + 1;
    end if;

    if i = st'last then
      Numbers(L) := Integer'Value(st (current .. i));
      L := L + 1;
      current := i + 1;
    end if;
    end loop;
  RETURN Numbers;
  end parseString;

  --Calculate the score of student
  FUNCTION grading_score ( Answer_values : IntArray; Student_values : IntArray ; Len : Integer ; Cost :
Integer) RETURN  Integer IS
    total : Integer;
    I : Positive := 1;
    begin
      total := 0;
      LOOP
      if Answer_values(I) = Student_values(I+1) then
        total := total + Cost;
      end if;
      I := I + 1;
      exit when I = Len + 1;
```

```
    END LOOP;
    RETURN total;
  end grading_score;

  --Procedure: Read entire data from file
  --calculate score of the students and parse the data
  --update the count/frequency.

  PROCEDURE readSData IS
    result : Integer;
    frequency_index : Integer;



  BEGIN
    while not End_OF_File (Input) loop
      declare
        Line : String := Get_Line (Input);


      begin
      Student_values :=
parseString(Ada.Strings.Unbounded.To_Unbounded_String(Line),count_num_of_questions+1);
      result := grading_score(Answer_values,Student_values,count_num_of_questions,Cost);
      Ada.Integer_Text_IO.Put(Student_values(1), Width=>5);
      Ada.Integer_Text_IO.Put(result);
      Ada.Text_IO.New_Line;
      frequency_index := result + 1;
      Frequency(frequency_index) := Frequency(frequency_index) + 1;
      total_Student := total_Student + 1;
      total_sum := total_sum + result;
```

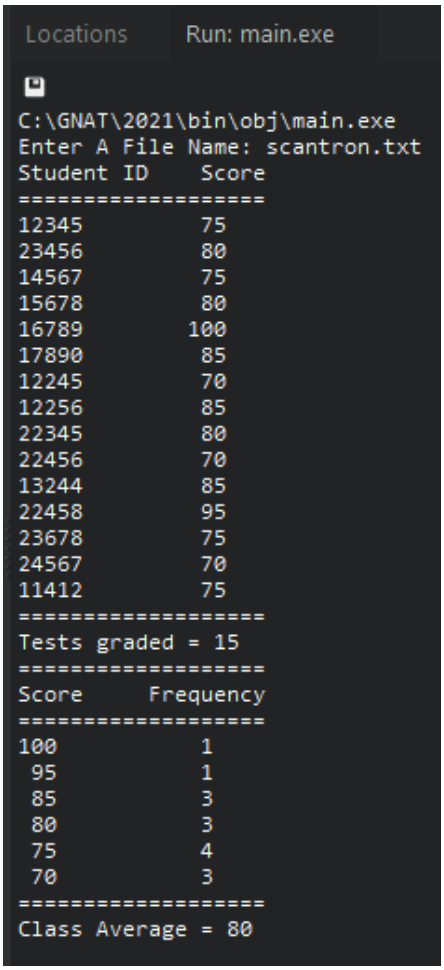
```
      end;
    end loop;
  END readSData;

begin
  -- get file name from user
  Ada.Text_IO.Put("Enter A File Name: ");
  file_name := Ada.Strings.Unbounded.To_Unbounded_String(Ada.Text_IO.Get_Line);

  --Open file
  Open (File => Input,
      Mode => In_File,
      Name => Ada.Strings.Unbounded.To_String(file_name));

  --read all question from file
  Total_Question := Ada.Strings.Unbounded.To_Unbounded_String(Get_Line(Input));

  --convert total question string to integer
  count_num_of_questions := Integer'Value(Ada.Strings.Unbounded.To_String(Total_Question));
  Cost := 100 / count_num_of_questions;
  total_Student := 0;
  total_sum := 0;

  -- read answer keys from file
  answer := Ada.Strings.Unbounded.To_Unbounded_String(Get_Line(Input));

  --convert total question string to array
  Answer_values := parseString(answer,count_num_of_questions);
  Ada.Text_IO.Put("Student ID    Score");
```

```
Ada.Text_IO.New_Line;

Ada.Text_IO.Put("==================");
Ada.Text_IO.New_Line;

--read student data from file and convert it into array
readSData;

Ada.Text_IO.Put("==================");
Ada.Text_IO.New_Line;

-- print total student
Ada.Text_IO.Put("Tests graded = ");
Ada.Integer_Text_IO.Put(total_Student, Width => 1);
Ada.Text_IO.New_Line;

Ada.Text_IO.Put("==================");
Ada.Text_IO.New_Line;

Ada.Text_IO.Put("Score     Frequency");
Ada.Text_IO.New_Line;

Ada.Text_IO.Put("==================");
Ada.Text_IO.New_Line;

-- print score frequncey
z123 := 150;
WHILE (z123 > 0) LOOP
   IF Frequency(z123) > 0 THEN
```

```
      Ada.Integer_Text_IO.Put(z123-1, Width => 3);
      Ada.Integer_Text_IO.Put(Frequency(z123), Width => 12);
      Ada.Text_IO.New_Line;
    END IF;
    z123 := z123 - 1;
  END LOOP;

  Ada.Text_IO.Put("====================");
  Ada.Text_IO.New_Line;

  --calculate average
  Ada.Text_IO.Put("Class Average = ");
  Ada.Integer_Text_IO.Put(total_sum / total_Student, Width => 1);
  Ada.Text_IO.New_Line;
  Ada.Text_IO.New_Line;
  Ada.Text_IO.New_Line;
  Ada.Text_IO.New_Line;

  Ada.Text_IO.Put("(*** Beware!! The data files can vary in number of questions up to 50, and there can
be any number (at least 1) of students. Your program must be flexible! ***)");
  Ada.Text_IO.New_Line;

  --Close file
  Ada.Text_IO.Close(File => Input);
exception
  when End_Error =>
    if Is_Open(Input) then
      Close (Input);
    end if;
```

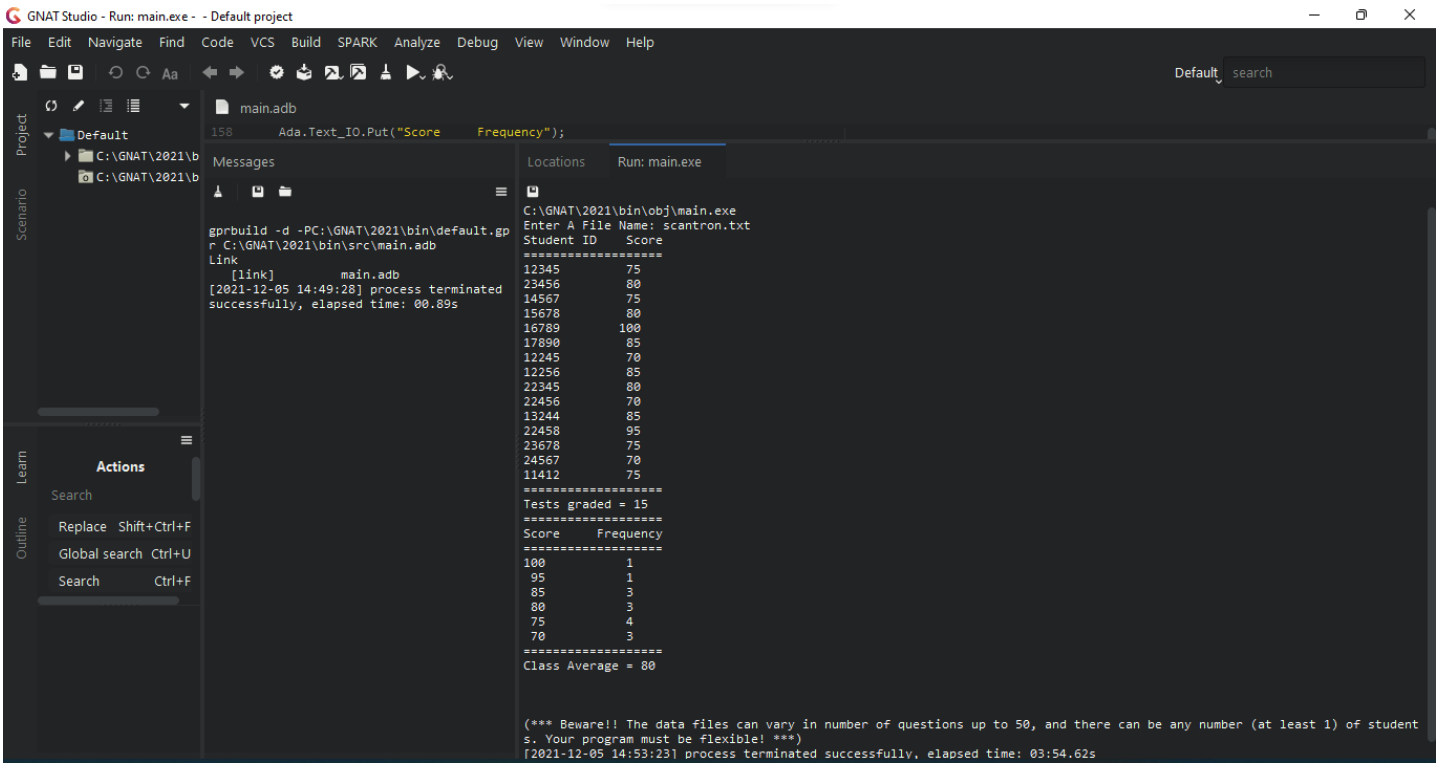
end main;

Output:



```
Locations    Run: main.exe

C:\GNAT\2021\bin\obj\main.exe
Enter A File Name: scantron.txt
Student ID    Score
==================
12345         75
23456         80
14567         75
15678         80
16789        100
17890         85
12245         70
12256         85
22345         80
22456         70
13244         85
22458         95
23678         75
24567         70
11412         75
==================
Tests graded = 15
==================
Score     Frequency
==================
100           1
 95           1
 85           3
 80           3
 75           4
 70           3
==================
Class Average = 80
```

```
(*** Beware!! The data files can vary in number of questions up to 50, and there can be any number (at least 1) of student
s. Your program must be flexible! ***)
[2021-12-05 14:53:23] process terminated successfully, elapsed time: 03:54.62s
```


GNAT Studio - Run: main.exe - - Default project
File Edit Navigate Find Code VCS Build SPARK Analyze Debug View Window Help
Default search
Project
Scenario
Default
C:\GNAT\2021\b
C:\GNAT\2021\b
main.adb
158 Ada.Text_IO.Put("Score Frequency");
Messages
gprbuild -d -PC:\GNAT\2021\bin\default.gpr C:\GNAT\2021\bin\src\main.adb
Link
[link] main.adb
[2021-12-05 14:49:28] process terminated successfully, elapsed time: 00.89s
Locations
Run: main.exe
C:\GNAT\2021\bin\obj\main.exe
Enter A File Name: scantron.txt
Student ID Score
==========
12345 75
23456 80
14567 75
15678 80
16789 100
17890 85
12245 70
12256 85
22345 80
22456 70
13244 85
22458 95
23678 75
24567 70
11412 75
==========
Tests graded = 15
==========
Score Frequency
==========
100 1
95 1
85 3
80 3
75 4
70 3
==========
Class Average = 80
(*** Beware!! The data files can vary in number of questions up to 50, and there can be any number (at least 1) of students. Your program must be flexible! ***)
[2021-12-05 14:53:23] process terminated successfully, elapsed time: 03:54.62s
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