

```
1 // Attached: HW_2a, HW_2b, HW_2c, HW_2d
2 //
3 // =====
4 // File: HW_2c
5 // =====
6 // Programmer: Stephen Moye
7 // Class: CMPR 121 Tuesday
8 // Instructor: Dennis Rainey
9 //
10 // Description:
11 // This program will read the grades
12 // of students from an external txt file
13 // an then display them in various ways
14 //
15 // =====
16
17 #include <iostream>
18 #include <iomanip>
19 #include <fstream>
20
21 using namespace std;
22
23 const int ROWS = 5;
24 const int COLS = 3;
25
26 void getGrades(char [ROWS][COLS]);
27 void displayGrades(char [ROWS][COLS]);
28 void displayGPA(char [ROWS][COLS]);
29 void displaySubGPA(char grades[ROWS][COLS]);
30
31 // =====
32 // main
33 // =====
34 int main()
35 {
36     char grades[ROWS][COLS];
37     getGrades(grades);
38     displayGrades(grades);
39     displayGPA(grades);
40     displaySubGPA(grades);
41
42     return 0;
43 }
44 // =====
45 // end of main
46 // =====
47
48
49
50 // =====
51 // getGrades
52 // =====
```

```
53 // this function reads the contents of a text file line by line
54 // and stores the data in a 2D array
55 //
56 // Input: grades, an empty, 5 by 3, 2D array
57 //
58 // Output: grades, filled with letter grades from the test file
59 //
60 // =====
61 void getGrades(char grades[ROWS][COLS])
62 {
63
64     ifstream fileIn;
65
66     fileIn.open("C:/Users/Steve/Desktop/School/Computer Science/CMPR121/Homework/
        HW_2/HW_2c/HW_2c/grades.txt");
67
68     if (fileIn.fail())
69     {
70         cout << "Error: cannot open file. \n";
71         exit(1);
72     }
73
74
75     for (int i = 0; i < ROWS; i++)
76     {
77         for (int j = 0; j < COLS; j++)
78         {
79             fileIn >> grades[i][j];
80         }
81     }
82 }
83 // =====
84 // end of getData
85 // =====
86
87
88
89 // =====
90 // displayGrades
91 // =====
92 // this function takes the grades from the 2D array and
93 // displays them in a formatted table
94 //
95 // Input: grades, a 2D array filled with grades data
96 //
97 // Output: a formatted table displaying letter grades for each subject/student
98 //
99 // =====
100 void displayGrades(char grades[ROWS][COLS])
101 {
102     cout << "All Grades" << endl
103         << "Student    " << "English    " << "History    " << "Math" << endl;
```



```
156         sum += 2;
157         break;
158     case 'D':
159         sum += 1;
160         break;
161     default:
162         break;
163     }
164 }
165 avg = sum / COLS;
166 cout << setw(7) << setprecision(2) << fixed << avg;
167
168     cout << endl;
169 }
170 }
171 // =====
172 // end of displayGPA function
173 // =====
174
175
176
177 // =====
178 // displaySubGPA
179 // =====
180 // this function takes the letter grades from the 2D array
181 // converts them to numbers, and displays the average GPA number for each subject
182 //
183 // Input: grades, a 2D array filled with grades data
184 //
185 // Output: the GPA average for each subject
186 //
187 // =====
188 void displaySubGPA(char grades[ROWS][COLS])
189 {
190
191     cout << "\nAverage GPA by Subject" << endl
192     << "English   " << "History   " << "Math" << endl;
193
194     for (int i = 0; i < COLS; i++)
195     {
196         float sum = 0;
197         float avg = 0;
198
199         for (int j = 0; j < ROWS; j++)
200         {
201             switch (grades[j][i]) {
202                 case 'A':
203                     sum += 4;
204                     break;
205                 case 'B':
206                     sum += 3;
```

```

207         break;
208     case 'C':
209         sum += 2;
210         break;
211     case 'D':
212         sum += 1;
213         break;
214     default:
215         break;
216     }
217 }
218 avg = sum / ROWS;
219 cout << setw(10) << setprecision(2) << fixed << left << avg;
220 }
221 cout << endl;
222 }
223 // =====
224 // end of displayGPA function
225 // =====
226
227
228
229 /* ===== Output =====
230
231 All Grades
232 Student   English   History   Math
233 #1         A         A         B
234 #2         C         C         F
235 #3         C         D         B
236 #4         B         A         C
237 #5         B         A         B
238
239 Student GPAs
240 Student
241 #1         3.67
242 #2         1.33
243 #3         2.00
244 #4         3.00
245 #5         3.33
246
247 Average GPA by Subject
248 English   History   Math
249 2.80      3.00     2.20
250
251 C:\Users\Steve\Desktop\School\Computer Science\CMPR121\Homework\HW_2\HW_2c\Debug  ↗
252   \HW_2c.exe (process 24724) exited with code 0.
253 To automatically close the console when debugging stops, enable Tools->Options-  ↗
254   >Debugging->Automatically close the console when debugging stops.
255 Press any key to close this window . . .
256
257 =====  ↗
258 */

```