```c
/*############################################################################*/
/*HW02_HASAN_MEN_131044009_part2.c                                            */
/*_____________________________                                               */
/*Written by Hasan MEN on February 27, 2015                                   */
/*                                                                            */
/*Description:                                                                */
/*____________                                                                */
/*This program find letter grade and contribution of letter                   */
/*with using exam result which store in Student file                          */
/*INPUT:                                                                      */
/*______                                                                      */
/*                                                                            */
/*##NOT:X is a variable like name1,name2,namex##                              */
/*  namex,snamex:first letter of names and surnames                           */
/*  midOnex,midTwox:midtterm results of students                              */
/*  finalx: final result of students                                          */
/*OUTPUT:                                                                     */
/*_______                                                                     */
/*  averagex:average of midOnex,midTwox,Finalx                                */
/*  snamex,namex                                                              */
/*  letter grade: calculated from averagex                                    */
/*  contribution of letter: additives on local credit                         */
/*  "contribution = (letter_grade*credit)/total_credit "                      */
/*############################################################################*/
#include <stdio.h>
#define MIN_AVERAGE 0       /* min_average, average can not less than zero*/
#define MIN_MARK 0          /* minimun-mark   0<=mark<=100*/
#define INVALID_MARK -1     /* use to return mark is false,invalid */

/* function prototypes*/
double average(int mid1,int mid2,int final);
char letterGrade(double average);
void ContributionLetterGrade(char letter);

int main(){
    /* START_OF_MAIN*/
    char name1,sname1,name2,sname2,name3,sname3,name4,sname4,name5,sname5;
    int midOneP1,midTwoP1,FinalOne;
    int midOneP2,midTwoP2,FinalTwo;
    int midOneP3,midTwoP3,FinalThree;
    int midOneP4,midTwoP4,FinalFour;
    int midOneP5,midTwoP5,FinalFive;

    char gradeOne,gradeTwo,gradeThree,gradeFour,gradeFive;
    double average1,average2,average3,average4,average5;

    FILE *inp;
    FILE *out;

    /* END_OF_VARIABLES*/

    /* define and open files */
    inp = fopen("Students.txt","r");
    out = fopen("Grades.txt","w");

    /* scanning student information from input file*/
    fscanf(inp,"%c%c%d%d%d",&name1,&sname1,&midOneP1,&midTwoP1,&FinalOne);
    fscanf(inp," %c%c%d%d%d",&name2,&sname2,&midOneP2,&midTwoP2,&FinalTwo);
    fscanf(inp," %c%c%d%d%d",&name3,&sname3,&midOneP3,&midTwoP3,&FinalThree);
    fscanf(inp," %c%c%d%d%d",&name4,&sname4,&midOneP4,&midTwoP4,&FinalFour);
    fscanf(inp," %c%c%d%d%d",&name5,&sname5,&midOneP5,&midTwoP5,&FinalFive);

    /* calculate average marks with average() fonction*/
    average1 = average(midOneP1,midTwoP1,FinalOne);
    average2 = average(midOneP2,midTwoP2,FinalTwo);
    average3 = average(midOneP3,midTwoP3,FinalThree);
    average4 = average(midOneP4,midTwoP4,FinalFour);
    average5 = average(midOneP5,midTwoP5,FinalFive);

    /*Print information to screen*/
    /* information : names,snames,averages,lettergrades and contributions */
    printf(" --------------- --------------- ");
    printf("--------------- -----------------\n");
    printf("|    STUDENT\t|    AVERAGE\t|    LETTER\t|   CONTRIBUTION   |\n");
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75      printf(" -------------- -------------- ");
76      printf("-------------- -----------------\n");
77      printf("\t%c%c\t\t%.1f\t\t%c\t\t",name1,sname1,average1,
78          letterGrade(average1));
79          ContributionLetterGrade(letterGrade(average1));
80
81      printf(" -------------- -------------- ");
82      printf("-------------- -----------------\n");
83      printf("\t%c%c\t\t%.1f\t\t%c\t\t",name2,sname2,average2,
84          letterGrade(average2));
85          ContributionLetterGrade(letterGrade(average2));
86
87      printf(" -------------- -------------- ");
88      printf("-------------- -----------------\n");
89      printf("\t%c%c\t\t%.1f\t\t%c\t\t",name3,sname3,average3,
90          letterGrade(average3));
91          ContributionLetterGrade(letterGrade(average3));
92
93      printf(" -------------- -------------- ");
94      printf("-------------- -----------------\n");+
95      printf("\t%c%c\t\t%.1f\t\t%c\t\t",name4,sname4,average4,
96          letterGrade(average4));
97          ContributionLetterGrade(letterGrade(average4));
98
99      printf(" -------------- -------------- ");
100     printf("-------------- -----------------\n");
101     printf("\t%c%c\t\t%.1f\t\t%c\t\t",name5,sname5,average5,
102         letterGrade(average5));
103         ContributionLetterGrade(letterGrade(average5));
104     printf(" -------------- -------------- ");
105     printf("-------------- -----------------\n");
106
107     /* when we see -1 on screen or file this means, there are a problem*/
108     /* it is our error codes */
109     printf("\n-------------\n\"-1\"=> Invalid number/letter\n-------------\n");
110
111 /* write some information and calculations to output file*/
112     fprintf(out,"%c%c %.2f\n",name1,sname1,average1);
113     fprintf(out,"%c%c %.2f\n",name2,sname2,average2);
114     fprintf(out,"%c%c %.2f\n",name3,sname3,average3);
115     fprintf(out,"%c%c %.2f\n",name4,sname4,average4);
116     fprintf(out,"%c%c %.2f\n",name5,sname5,average5);
117
118
119     /*close files*/
120     fclose(inp);
121     fclose(out);
122     return 0;
123     /*END_OF_MAIN*/
124 }
125
126 /*#################################################################*/
127 /* This function takes exam notes and calculate average          */
128 /*  average = 30percent of midterms and 40percent of final       */
129 /*#################################################################*/
130 double average(int mid1,int mid2,int final){
131
132     if (mid1>=MIN_MARK && mid2>=MIN_MARK && final>=MIN_MARK)
133         return (mid1*3+mid2*3+final*4)/10.0;
134     else return INVALID_MARK; /* return -1 if marks<0 */
135 }
136
137 /*#################################################################*/
138 /* This function takes averege marks if it's bigger than minimum */
139 /* average will return a letter according to notes table         */
140 /* letters can be A,B,C,D,F                                       */
141 /* if average<min_average will return error code(-1)             */
142 /*#################################################################*/
143 char letterGrade(double average){
144
145     if(average>=MIN_AVERAGE){
146         if(average>=85)
147             return 'A';
148         else if(average >=70)
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            return 'B';
        else if(average >=65)
            return 'C';
        else if(average >=40)
            return 'D';
        else return 'F';
    }
    else return 'X';
}


/*#####################################################################*/
/* This function takes letter_grade from main and calculate     */
/* contribution of letter and write on screen                   */
/*#####################################################################*/
void ContributionLetterGrade(char letter){

    switch (letter){

    case 'A' : printf("%.2f\n",(4.0*3.0)/20.0); break;
    case 'B' : printf("%.2f\n",(3.0*3.0)/20.0); break;
    case 'C' : printf("%.2f\n",(2.0*3.0)/20.0); break;
    case 'D' : printf("%.2f\n",(1.0*3.0)/20.0); break;
    case 'F' : printf("%.2f\n",(0.0*3.0)/20.0); break;
    default : printf("Unknown letter grade\n"); /* invalid letter*/
    }

}
/*#####################################################################*/
/*              END_OF_HW02_HASAN_MEN_131044009_part2.c              */
/*#####################################################################*/
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