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/*
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LA #1
*/
// min, max, print summary
#include <stdio.h>
#include <math.h>

float calc_av(long sum, int numint);
float STDV(int curr, float average);
void Grade_it(float grade, FILE *outptr);
void Grade_it2(int grade, FILE *outptr);
void Grade_it3(int grade, FILE *outptr);

int main(void){
    int x = -1;
    FILE *outptr;

    while (x != 0 && x != 1){
        printf("Please enter 0 if you want to print to screen and 1 if save to
            file output.txt \n");
        scanf("%d", &x);
    }
    if (x == 0)
        outptr = stdout;
    else{
        outptr = fopen("output.txt", "w");
        if (outptr == NULL)
        {
            printf("Error, could not write file, will default to screen\n");
            outptr = stdout;
        }
    }

    fprintf(outptr, "/-----
    -----\\n");

    fprintf(outptr, "|-----
    -----|\\n");
    fprintf(outptr, "|      2011      |      2012      |      2013      |      2014
    |      2015      |\\n");
    fprintf(outptr, "|-----+-----+-----+-----
    +-----+-----+-----+-----|\\n");
    fprintf(outptr, "|  SC  STDV  GR  |  SC  STDV  GR  |  SC  STDV  GR  |  SC  STDV
    GR  |  SC  STDV  GR  |\\n");
    fprintf(outptr, "|-----+-----+-----+-----
    +-----+-----+-----+-----|\\n");

    //ROUND ONE
    //2011
    int min1 = 1000;
    int max1 = 0;
    int numint1 = 0;
    int curr1;
    long sum1 = 0;

    FILE *fptr1;
    fptr1 = fopen("2011.txt", "r");
    if (fptr1 == NULL)
    {
        printf("Error, could not read file\n");
        return(0);
    }
    while (fscanf(fptr1, "%d", &curr1) != EOF)
    {
        numint1++;
        sum1 += curr1;
    }

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        if (curr1 <= min1)
            min1 = curr1;
        if (curr1 >= max1)
            max1 = curr1;
    }

    float average1 = calc_av(sum1, numint1);
    fclose(fp1);

//2012
int min2 = 1000;
int max2 = 0;
int numint2 = 0;
int curr2;
long sum2 = 0;

FILE *fp2;
fp2 = fopen("2012.txt", "r");
if (fp2 == NULL)
{
    printf("Error, could not read file\n");
    return(0);
}
while (fscanf(fp2, "%d", &curr2) != EOF)
{
    numint2++;
    sum2 += curr2;
    if (curr2 <= min2)
        min2 = curr2;
    if (curr2 >= max2)
        max2 = curr2;
}

float average2 = calc_av(sum2, numint2);
fclose(fp2);

//2013
int min3 = 1000;
int max3 = 0;
int numint3 = 0;
int curr3;
long sum3 = 0;

FILE *fp3;
fp3 = fopen("2013.txt", "r");
if (fp3 == NULL)
{
    printf("Error, could not read file\n");
    return(0);
}
while (fscanf(fp3, "%d", &curr3) != EOF)
{
    numint3++;
    sum3 += curr3;
    if (curr3 <= min3)
        min3 = curr3;
    if (curr3 >= max3)
        max3 = curr3;
}

float average3 = calc_av(sum3, numint3);
fclose(fp3);

//2014

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int min4 = 1000;
int max4 = 0;
int numint4 = 0;
int curr4;
long sum4 = 0;

FILE *fptr4;
fptr4 = fopen("2014.txt", "r");
if (fptr4 == NULL)
{
    printf("Error, could not read file\n");
    return(0);
}
while (fscanf(fptr4, "%d", &curr4) != EOF)
{
    numint4++;
    sum4 += curr4;
    if (curr4 <= min4)
        min4 = curr4;
    if (curr4 >= max4)
        max4 = curr4;
}

float average4 = calc_av(sum4, numint4);
fclose(fptr4);

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//2015
int min5 = 1000;
int max5 = 0;
int numint5 = 0;
int curr5;
long sum5 = 0;

FILE *fptr5;
fptr5 = fopen("2015.txt", "r");
if (fptr5 == NULL)
{
    printf("Error, could not read file\n");
    return(0);
}
while (fscanf(fptr5, "%d", &curr5) != EOF)
{
    numint5++;
    sum5 += curr5;
    if (curr5 <= min5)
        min5 = curr5;
    if (curr5 >= max5)
        max5 = curr5;
}

float average5 = calc_av(sum5, numint5);
fclose(fptr5);

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//ROUND TWO

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fptr1 = fopen("2011.txt", "r");
fptr2 = fopen("2012.txt", "r");
fptr3 = fopen("2013.txt", "r");
fptr4 = fopen("2014.txt", "r");
fptr5 = fopen("2015.txt", "r");

int flag1 = 1;
int flag2 = 1;
int flag3 = 1;
int flag4 = 1;
int flag5 = 1;

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while (flag1 || flag2 || flag3 || flag4 || flag5){
    //2011
    if(flag1) {
        if (fscanf(fp1, "%d", &curr1) == EOF){
            flag1 = 0;
        }

        if(!flag1) {
            fprintf(outptr,"| - - - - -");
        }
        else{
            if (curr1 == min1){
                fprintf(outptr,"| #3d %5.1f ", curr1, STDV(curr1, average1));
                Grade_it(curr1, outptr);}
            else if (curr1 == max1){
                fprintf(outptr,"| @3d %5.1f ", curr1, STDV(curr1, average1));
                Grade_it(curr1, outptr);}
            else if(curr1 >0){
                fprintf(outptr,"| %3d %5.1f ", curr1, STDV(curr1, average1));
                Grade_it(curr1, outptr);}
            else if (0>= curr1 && curr1 >= (-10.5)){
                fprintf(outptr,"| %3d %5.1f ", curr1, STDV(curr1, average1));
                Grade_it(curr1, outptr);}
            else{
                fprintf(outptr,"| %3d %5.1f", curr1, STDV(curr1, average1));
                Grade_it(curr1, outptr);}
        }
    }
    else {
        fprintf(outptr,"| - - - - -");
    }

    //2012
    if(flag2) {
        if (fscanf(fp2, "%d", &curr2) == EOF){
            flag2 = 0;
        }

        if(!flag2) {
            fprintf(outptr,"| - - - - -");
        }
        else{
            if (curr2 == min2){
                fprintf(outptr,"| #3d %5.1f ", curr1, STDV(curr1, average1));
                Grade_it(curr2, outptr);}
            else if (curr2 == max2){
                fprintf(outptr,"| @3d %5.1f ", curr1, STDV(curr1, average1));
                Grade_it(curr2, outptr);}
            else if(curr2 >0){
                fprintf(outptr,"| %3d %5.1f ", curr2, STDV(curr2, average2));
                Grade_it(curr2, outptr);}
            else if (0>= curr2 && curr2 >= (-10.5)){
                fprintf(outptr,"| %3d %5.1f ", curr2, STDV(curr2, average2));
                Grade_it(curr2, outptr);}
            else{
                fprintf(outptr,"| %3d %5.1f", curr2, STDV(curr2, average2));
                Grade_it(curr2, outptr);}
        }
    }
    else {
        fprintf(outptr,"| - - - - -");
    }

    //2013
    if(flag3) {
        if (fscanf(fp3, "%d", &curr3) == EOF){

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        flag3 = 0;
    }

    if(!flag3) {
        fprintf(outptr,"| - - - - -");
    }
    else{
        if (curr3 == min3){
            fprintf(outptr,"| #3d %5.1f ", curr1, STDV(curr1, average1));
            Grade_it(curr3, outptr);}
        else if (curr3 == max3){
            fprintf(outptr,"| @3d %5.1f ", curr1, STDV(curr1, average1));
            Grade_it(curr3, outptr);}
        else if(curr3 >0){
            fprintf(outptr,"| 3d %5.1f ", curr3, STDV(curr3, average3));
            Grade_it(curr3, outptr);}

        else if (0>= curr3 && curr3 >= (-10.5)){
            fprintf(outptr,"| 3d %5.1f ", curr3, STDV(curr3, average3));
            Grade_it(curr3, outptr);}
        else{
            fprintf(outptr,"| 3d %5.1f", curr3, STDV(curr3, average3));
            Grade_it(curr3, outptr);}
    }
}
else {
    fprintf(outptr,"| - - - - -");
}

//2014
if(flag4) {
    if (fscanf(fp4, "%d", &curr4) == EOF){
        flag4 = 0;
    }

    if(!flag4) {
        fprintf(outptr,"| - - - - -");
    }
    else{
        if (curr4 == min4){
            fprintf(outptr,"| #3d %5.1f ", curr1, STDV(curr1, average1));
            Grade_it(curr4, outptr);}
        else if (curr4 == max4){
            fprintf(outptr,"| @3d %5.1f ", curr1, STDV(curr1, average1));
            Grade_it(curr4, outptr);}
        else if(curr4 >0){
            fprintf(outptr,"| 3d %5.1f ", curr4, STDV(curr4, average4));
            Grade_it(curr4, outptr);}

        else if (0>= curr4 && curr4 >= (-10.5)){
            fprintf(outptr,"| 3d %5.1f ", curr4, STDV(curr4, average4));
            Grade_it(curr4, outptr);}
        else{
            fprintf(outptr,"| 3d %5.1f", curr4, STDV(curr4, average4));
            Grade_it(curr4, outptr);}
    }
}
else {
    fprintf(outptr,"| - - - - -");
}

//2015
if(flag5) {
    if (fscanf(fp5, "%d", &curr5) == EOF){
        flag5 = 0;
    }

    if(!flag5) {
        fprintf(outptr,"| - - - - -");
    }
}

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        fprintf(outptr,"|\n");
    }
    else{
        if (curr5 == min5){
            fprintf(outptr,"|###3d %5.1f  ", curr1, STDV(curr1, average1));
            Grade_it(curr5, outptr);
            fprintf(outptr,"|\n");
        }
        else if (curr5 == max5){
            fprintf(outptr,"|@%3d %5.1f  ", curr1, STDV(curr1, average1));
            Grade_it(curr5, outptr);
            fprintf(outptr,"|\n");
        }
        else if (curr5 >0){
            fprintf(outptr,"| %3d %5.1f  ", curr5, STDV(curr5, average5));
            Grade_it(curr5, outptr);
            fprintf(outptr,"|\n");}
        else if (0>= curr5 && curr5 >= (-10.5)){
            fprintf(outptr,"| %3d %5.1f  ", curr5, STDV(curr5, average5));
            Grade_it(curr5, outptr);
            fprintf(outptr,"|\n");}
        else{
            fprintf(outptr,"| %3d %5.1f", curr5, STDV(curr5, average5));
            Grade_it(curr5, outptr);
            fprintf(outptr,"|\n");}
    }
}

else {
    fprintf(outptr,"| - - - - -");
    fprintf(outptr,"|\n");
}

}

fclose(fp1);
fclose(fp2);
fclose(fp3);
fclose(fp4);
fclose(fp5);

fprintf(outptr,"|-----|
-----|\n");
fprintf(outptr,"| %3d | %3d | %3d | %3d
| %3d |\n",numint1, numint2, numint3, numint4, numint5);
Grade_it2(min1, outptr);
Grade_it2(min2, outptr);
Grade_it2(min3, outptr);
Grade_it2(min4, outptr);
Grade_it2(min5, outptr);
fprintf(outptr,"|\n");

Grade_it2(max1, outptr);
Grade_it2(max2, outptr);
Grade_it2(max3, outptr);
Grade_it2(max4, outptr);
Grade_it2(max5, outptr);
fprintf(outptr,"|\n");

Grade_it2(average1, outptr);
Grade_it2(average2, outptr);
Grade_it2(average3, outptr);
Grade_it2(average4, outptr);
Grade_it2(average5, outptr);
fprintf(outptr,"|\n");

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fprintf(outptr, "\
-----/ \n");

fclose(outptr);

return(0);

}

float calc_av(long sum, int numint){
    float average;
    average = ((float) sum / numint);
    //printf("%f \n", average);
    return(average);
}

float STDV(int curr, float average){
    float curr_STDV = 0;
    curr_STDV = (float) curr - average;
    return(curr_STDV);
}

void Grade_it(float grade, FILE *outptr){
    if (grade >= 97.5 && grade <= 100)
        fprintf(outptr, "A*");
    else if (grade >= 91.5 && grade < 97.5)
        fprintf(outptr, "A ");
    else if (grade >= 85.5 && grade < 91.5)
        fprintf(outptr, "A-");
    else if (grade >= 81.5 && grade < 85.5)
        fprintf(outptr, "B+");
    else if (grade >= 77 && grade < 81.5)
        fprintf(outptr, "B ");
    else if (grade >= 73 && grade < 77)
        fprintf(outptr, "B-");
    else if (grade >= 69 && grade < 73)
        fprintf(outptr, "C+");
    else if (grade >= 65 && grade < 69)
        fprintf(outptr, "C ");
    else if (grade >= 61 && grade < 65)
        fprintf(outptr, "C-");
    else if (grade >= 48 && grade < 61)
        fprintf(outptr, "D ");
    else
        fprintf(outptr, "E ");
}

void Grade_it2(int grade, FILE *outptr){
    if (grade >= 97.5 && grade <= 100)
        fprintf(outptr, "| %3d A* ", grade);
    else if (grade >= 91.5 && grade < 97.5)
        fprintf(outptr, "| %3d A ", grade);
    else if (grade >= 85.5 && grade < 91.5)
        fprintf(outptr, "| %3d A- ", grade);
    else if (grade >= 81.5 && grade < 85.5)
        fprintf(outptr, "| %3d B+ ", grade);
    else if (grade >= 77 && grade < 81.5)
        fprintf(outptr, "| %3d B ", grade);
    else if (grade >= 73 && grade < 77)
        fprintf(outptr, "| %3d B- ", grade);
    else if (grade >= 69 && grade < 73)
        fprintf(outptr, "| %3d C+ ", grade);
    else if (grade >= 65 && grade < 69)
        fprintf(outptr, "| %3d C ", grade);
    else if (grade >= 61 && grade < 65)
        fprintf(outptr, "| %3d C- ", grade);
    else if (grade >= 48 && grade < 61)

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        fprintf(outptr,"| %3d      D      ", grade);
else
    fprintf(outptr,"| %3d      E      ", grade);
}

void Grade_it3(int grade, FILE *outptr){
    if (grade >= 97.5 && grade <= 100)
        fprintf(outptr,"|      %3d A*   ", grade);
    else if (grade >= 91.5 && grade < 97.5)
        fprintf(outptr,"|      %3d A    ", grade);
    else if (grade >= 85.5 && grade < 91.5)
        fprintf(outptr,"|      %3d A-   ", grade);
    else if (grade >= 81.5 && grade < 85.5)
        fprintf(outptr,"|      %3d B+   ", grade);
    else if (grade >= 77 && grade < 81.5)
        fprintf(outptr,"|      %3d B    ", grade);
    else if (grade >= 73 && grade < 77)
        fprintf(outptr,"|      %3d B-   ", grade);
    else if (grade >= 69 && grade < 73)
        fprintf(outptr,"|      %3d C+   ", grade);
    else if (grade >= 65 && grade < 69)
        fprintf(outptr,"|      %3d C    ", grade);
    else if (grade >= 61 && grade < 65)
        fprintf(outptr,"|      %3d C-   ", grade);
    else if (grade >= 48 && grade < 61)
        fprintf(outptr,"|      %3d D    ", grade);
    else
        fprintf(outptr,"|      %3d E    ", grade);
}

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