

Computer Programming
Bachelor in Biomedical Engineering
Bachelor in Applied Mathematics and Computing
Course 2020 / 2021

Review Exercises III
– SOLUTIONS –

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Exercise 1

Write a program that reads numbers from 1 to 9 in a file named “numbers.txt”, counts how many times each of them appears, and creates a file named “counting.txt” with the result.

Example:

Content of the file *numbers.txt*

```
2 3 4 2 3 4 2 2 7 2 3 5 3 2 3 4 5 6
```

Content of the file *counting.txt* after execution

```
1 - 0 times
2 - 6 times
3 - 5 times
4 - 3 times
5 - 2 times
6 - 1 times
7 - 1 times
8 - 0 times
9 - 0 times
```

SOLUTION

```
fid = fopen('numbers.txt','rt');
count = zeros(1,9);
vRead = [];
% First we read all the information in the file
while ~feof(fid)
    vnumber = fscanf(fid,'%d', 1);
    vRead = [vRead vnumber];
end
fclose(fid);
% Then we count how many times the numbers 1 to 9 appear in the vector
for i=1:9
    for j=1:length(vRead)
        if i == vRead(j)
            count(i) = count(i) + 1;
        end
    end
end
% Finally we write the result in the output file
fid2 = fopen('counting.txt','wt');
for i=1:8
    fprintf(fid2, '%d - %d times\n',i, count(i));
end
```

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Exercise 2

Write a program for copying information introduced by the user into a text file. After program execution, all the information introduced by the user should be stored in a text file called 'output.txt'. When the user introduces a line containing only the word *bye*, the program stops. In case the program is executed again, the new information should be appended to the file.

Example of information introduced by the user:

```
This is a test
for exercise 9
cats text cats
bye
```

Content of the file output.txt after execution:

```
This is a test
for exercise 9
cats text cats
```

SOLUTION

```
vfile = fopen('output.txt', 'at+');
if vfile == -1
    disp('Error. Could not open the files.');
```

```
else
    sline = input('', 's');
    bFirst = 1;
    while not(strcmp(sline, 'bye') == 1)
        if bFirst == 1
            fprintf(vfile, '%s', sline);
            bFirst = 0;
        else
            fprintf(vfile, '\n%s', sline);
        end
        sline = input('', 's');
```

```
end
fclose(vfile);
end
```

Exercise 3



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SOLUTION

```

vfile = fopen('textfile1.txt', 'rt');
vfile2 = fopen('textfile2.txt', 'wt');
bFirst = 1;
while notfeof(vfile)
    vline= fgetl(vfile);
    if bFirst == 1
        fprintf(vfile2, '%s', upper(vline));
        bFirst = 0;
    else
        fprintf(vfile2, '\n%s', upper(vline));
    end
end
fclose(vfile);
fclose(vfile2);

```

Exercise 4

Write a program that asks the user to introduce the names of two text files, compares their content and indicates if they are equal.

SOLUTION

```

vname1 = input('Introduce the name of the first file you want to compare: ', 's');
vname2 = input('Introduce the name of the second file you want to compare: ', 's');
vfile1 = fopen(vname1, 'rt');
vfile2 = fopen(vname2, 'rt');
if vfile1 == -1 || vfile2 == -1
    disp('File not found');
else
    bEqual = 1;
    while (feof(vfile1)==0) && (feof(vfile2)==0) && (bEqual == 1)
        sline1 = fgets(vfile1);
        sline2 = fgets(vfile2);
        if (strcmp(sline1,sline2) == 0)
            bEqual = 0;
        end
    end
    % Now we need to know if the while finished because they are equal
    % or because we reached the end of one of the files
    % and the other file includes more information
    if (bEqual == 1)
        if ((feof(vfile1)==1) && (feof(vfile2)==0)) || (feof(vfile1)==0

```

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```
fclose(vfile2);
end
```

Exercise 5

Write a program for writing a text file with the times of the runners of a race. The information about the runners is stored in a file named 'hobbitrun.txt' following the format:

runnerid name surname age gender

where *runnerid* and *age* are integers, *name* and *surname* are strings, and *gender* is either an F (female) or an M (male).

The times of the runners are stored in another file named 'times.txt' following the format:

runnerid hours:minutes:seconds

There are three categories of runners according to their age:

- **Sub-23**, for runners below 23 years old
- **Elite**, for runners between 23 and 60 years old
- **Masters**, for runners older than 60 years old

The program should organize the information in the files and produce six files:

- *m-sub23.txt*: times of the male runners of the category sub-23
- *f-sub23.txt*: times of the female runners of the category sub-23
- *m-elite.txt*: times of the male runners of the category elite
- *f-elite.txt*: times of the female runners of the category elite
- *m-masters.txt*: times of the male runners of the category masters
- *f-masters.txt*: times of the female runners of the category master

Each file contains the information about the runners of the corresponding category, including their times.

FUNCTION

```
function [indexrdo, err] = findrunner(vrunners, ndorsal)
err = 'OK';
pos = 1;
indexrdo = -1;
while (pos <= length(vrunners)) && (indexrdo == -1)
    if vrunners(pos).dorsal == ndorsal
```

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MAIN PROGRAM

```

clear vstimes;
clear runners;
clear C;
fid = fopen('times.txt','rt');
fid2 = fopen('hobbitrun.txt','rt');
if (fid == -1) || (fid2 == -1)
    disp('Error. Could not open the files.');
```

else

```

    % Read the times
    cont = 0;
    while feof(fid) ==0
        vDorsal = fscanf(fid,'%d',1);
        vhours = fscanf(fid,'%d',1);
        vdash = fscanf(fid,'%c',1);
        vmins = fscanf(fid,'%d',1);
        vdash = fscanf(fid,'%c',1);
        vseconds = fscanf(fid,'%d',1);
        cont = cont + 1;
        vstimes(cont).dorsal = vDorsal;
        vstimes(cont).hours = vhours;
        vstimes(cont).mins = vmins;
        vstimes(cont).seconds = vseconds;
        vstimes(cont).total = vhours*3600 + vmins*60 + vseconds;
    end
    % Read the data of the runners
    cont = 0;
    while feof(fid2)==0
        C = textscan(fid2,'%d %s %s %d %c',1);
        cont = cont +1;
        runners(cont).dorsal = C{1}(1);
        runners(cont).name = C{2}{1};
        runners(cont).surname = C{3}{1};
        runners(cont).age = C{4}(1);
        runners(cont).gender = C{5}(1);
    end
    % Create the rankings, read from the times vector of structures
    % Search for corresponding runner in runners structure
    fra1 = fopen('m-sub23.txt','wt');
    bFirst1 = 1;
    fra2 = fopen('f-sub23.txt','wt');
    bFirst2 = 1;
    fra3 = fopen('m-elite.txt','wt');
    bFirst3 = 1;
    fra4 = fopen('f-elite.txt','wt');
    bFirst4 = 1;
    fra5 = fopen('m-masters.txt','wt');
    bFirst5 = 1;
    fra6 = fopen('f-masters.txt','wt');
    bFirst6 = 1;
```



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```

        bFirst1 = 0;
    end
else
    fra = fra2;
    if bFirst2 == 1
        bFirst = 1;
        bFirst2 = 0;
    end
end
elseif runners(indexrun).age < 60
    if runners(indexrun).gender == 'M'
        fra = fra3;
        if bFirst3 == 1
            bFirst = 1;
            bFirst3 = 0;
        end
    else
        fra = fra4;
        if bFirst4 == 1
            bFirst = 1;
            bFirst4 = 0;
        end
    end
elseif runners(indexrun).gender == 'M'
    fra = fra5;
    if bFirst5 == 1
        bFirst = 1;
        bFirst5 = 0;
    end
else
    fra = fra6;
    if bFirst6 == 1
        bFirst = 1;
        bFirst6 = 0;
    end
end
if bFirst == 1
    fprintf(fra, '%d %s %s %d-%d-%d', runners(indexrun).dorsal,
runners(indexrun).name, runners(indexrun).surname, vstimes(i).hours,
vstimes(i).mins, vstimes(i).seconds);
    bFirst = 0;
else
    fprintf(fra, '\n%d %s %s %d-%d-%d', runners(indexrun).dorsal,
runners(indexrun).name, runners(indexrun).surname, vstimes(i).hours,
vstimes(i).mins, vstimes(i).seconds);
end
end
end
fclose(fra1);
fclose(fra2);
fclose(fra3);

```

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Exercise 6

IKEA asked you to write a program to help their customers when selecting the furniture that best suits their necessities.

The IKEA catalog is stored in file 'IKEA.txt' following the format:

```
productID name type weight height price color
```

where *productID* is an integer, *name*, *type* and *color* are strings and *weight*, *height* and *price* are numbers with decimals.

The program should allow the user to:

- 1.- Display the information about a particular product identified by its name on screen. The program asks the user to introduce the name of the product and displays the product's information.
- 2.- Display all the products of a specific type. The user should be able to filter the search by weight and height (display only the products whose dimensions are smaller than a given weight and height introduced by the user).

Note: Try to solve the problem splitting the code into functions. For example: searchByProduct, searchByCategory, ...

Example of execution:

```
Do you want to display (A) a product (B) all the products of a
category or (Q) Quit(Q)? A
```

```
Introduce the name of the product: GRONKULLA
```

```
Product information:
```

```
Name: GRONKULLA
Type: Table
Weight: 1.50
Height: 2.00
Price: 250.00
Color: red
```

```
Do you want to display (A) a product (B) all the products of a
category or (Q) Quit(Q)? B
```

```
Introduce a category: Curtain
```

```
Introduce a maximum weight: 4
```

```
Introduce a maximum height: 6
```

```
Product list
```

```
Name: RIKTIG
Type: Curtain
Weight: 3.00
Height: 3.00
Price: 50.00
Color: blue
```

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FUNCTIONS

```
function [pos] = searchByProduct (vproducts, sname)
pos = 0;
bFound = 0;
while ((bFound == 0) && (pos < length(vproducts)))
    pos = pos +1;
    if (strcmp(vproducts(pos).name, sname) == 1)
        bFound = 1;
    end
end
if bFound == 0
    pos = -1; % If not found, return -1
end
end

function [vect] = searchByCategory (vproducts, scat, maxw, maxh)
vect = [];
for i=1:length(vproducts)
    if ((strcmp(vproducts(i).category, scat) == 1) &&
        (vproducts(i).weight <= maxw) && (vproducts(i).height <= maxh))
        vect = [vect i];
    end
end
end

function [] = displayProductInfo (vproducts, pos)
fprintf('\n Name: %s', vproducts(pos).name);
fprintf('\n Type: %s', vproducts(pos).category);
fprintf('\n Weight: %.2f', vproducts(pos).weight);
fprintf('\n Height: %.2f', vproducts(pos).height);
fprintf('\n Price: %.2f', vproducts(pos).price);
fprintf('\n Color: %s', vproducts(pos).color);
end
```

MAIN PROGRAM

```
clear;
fid = fopen('IKEA.txt', 'rt');
if fid == -1
    disp('Error when opening the file');
else
    i = 0;
    while feof(fid)==0
        C = textscan(fid, '%s %s %s %f %f %f %s', 1);
        i = i +1;
    end
end
```

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```

fprintf('\n');
opt = input('Do you want to display (A) a product (B) all the
products of a category or (Q) Quit? ','s');
while ((opt ~= 'A') && (opt ~= 'B') && (opt ~= 'Q'))
    disp('Wrong option');
    opt = input('Do you want to display (A) a product (B) all the
products of a category or (Q) Quit? ','s');
end
if opt == 'A'
    name = input('Introduce the name of the product: ','s');
    index = searchByProduct(product,name);
    if index == -1
        disp('Error, product not found');
    else
        disp ('Product information:');
        displayProductInfo(product,index);
    end
elseif opt == 'B'
    category = input('Introduce a category: ','s');
    maxw = input('Introduce a maximum weight: ');
    maxh = input('Introduce a maximum height: ');
    vindex = searchByCategory(product,category,maxw,maxh);
    disp('Product list');
    for j=1:length(vindex)
        displayProductInfo(product,vindex(j));
    end
end
end
end
end

```

Exercise 7

Write a program that reads numbers in a file named “numbers2.txt”, counts how many times each of them appears, and creates a file named “counting2.txt” with the result. Note: it will only print the numbers which appear in the file (this is a different problem as the one presented in the first exercise).

Example:

Content of the file numbers2.txt

```
29 3 20 3 4 23 2 7 2 23 5 3 2 31 4 5 60
```

Content of the file counting2.txt after the execution

```
29 - 1 times
3 - 3 times
20 - 1 times
4 - 2 times
```

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SOLUTION

```

fid = fopen('numbers2.txt','rt');
% strcount is a structure in which we will store the numbers and the
times they appear
clear strcount;
vRead = [];
% first, we read all the information in the file
while feof(fid) ==0
    vnumber = fscanf(fid,'%d',1);
    vRead = [vRead vnumber];
end
fclose(fid);
% index indicates the position of the vector of structures in which we
are putting the information
index = 0;
while length(vRead) >= 1
    index = index + 1;
    % we take the first number from vRead and we set the count to one
    strcount(index).number = vRead(1);
    strcount(index).times = 1;
    % then, we delete the number from the vector
    vRead(1) = [];
    % and count how many times the number appears in the rest of the
vector
    j = 1;
    while j <= length(vRead)
        if strcount(index).number == vRead(j)
            % each time we find the number in the vector we increase its
counter and delete it from the vector
            strcount(index).times = strcount(index).times + 1;
            vRead(j) = [];
        else
            j = j + 1;
        end
    end
end

% finally, we write the result to the output file
fid2 = fopen('counting2.txt','wt');
for i=1:length(strcount)-1
    fprintf(fid2, '%d - %d times\n',strcount(i).number,
strcount(i).times);
end
% we make sure that the last line doesn't create an extra blank line
fprintf(fid2, '%d - %d times',strcount(length(strcount)).number,
strcount(length(strcount)).times);
fclose(fid2);

```



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| ID | COURSE | TEACHER | DEGREE | ENGLISH | CREDITS |
|---------|---------------|-----------|-------------|---------|---------|
| 1002356 | Programming | Mendoza | Engineering | N | 3 |
| 1004562 | Poetry | Diaz | English | Y | 5 |
| 1004578 | Postmodernism | Perez | English | Y | 6 |
| 1007658 | Statistics | Montoya | Mathematics | Y | 8 |
| 1005123 | Optics | Mojica | Physics | Y | 5 |
| 1006235 | Classics | Aguilar | English | N | 4 |
| 1002568 | Electronics | Velasquez | Engineering | Y | 4 |
| 1005687 | Biophysics | Tormo | Physics | N | 4 |
| 1004854 | Modernism | Sanchez | English | Y | 4 |

The program asks the user to introduce from which degree they would like to choose a course, and whether he/she would like the course to be in English. Next, the program will display the available courses according to the user's criteria. The user is then asked to choose from the available courses according to their criteria until they introduce an empty string.

At the end, the program generates the file *choices.txt* that lists the courses chosen, as well as the total number of credits.

Example of execution:

```

From which degree would you like to choose a course? English
Would you like the course to be in English (Y/N)? Y
These are the courses available according to your criteria:
English: Poetry, Credits: 5
English: Postmodernism, Credits: 6
English: Modernism, Credits: 4
Introduce name of course: Poetry
Introduce name of course: Modernism
Introduce name of course:
File created successfully!
    
```

Content of *choices.txt* after execution:

| ID | COURSE | TEACHER | DEGREE | ENGLISH | CREDITS |
|------------------|-----------|---------|---------|---------|---------|
| 1004562 | Poetry | Diaz | English | Y | 5 |
| 1004578 | Modernism | Perez | English | Y | 4 |
| TOTAL CREDITS: 9 | | | | | |

SOLUTION

```

clear;
clc;
fid = fopen('courses.txt', 'rt');
if fid < 0
    disp('Error opening file');
else
    %READ FILE AND STORE CONTENTS
    
```



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```

        courses(i).credits = info{6}(1);
    end
end
fclose(fid);

%DISPLAY AVAILABLE COURSES
disp('The courses available are');
for i = 1:length(courses)
    fprintf('%s: %s (English: %s, Credits: %d)\n', courses(i).degree,
courses(i).course, courses(i).english, courses(i).credits);
end

%ASK FOR DEGREE AND ENGLISH
degree = input('From which degree would you like to choose a course? ',
's');
english = input('Would you like the course to be in English (Y/N)? ',
's');

%LIST AVAILABLE COURSES
disp('These are the courses available according to your criteria:');
for i = 1:length(courses)
    if strcmpi(courses(i).degree, degree) && courses(i).english ==
english
        fprintf('%s: %s, Credits: %d\n', courses(i).degree,
courses(i).course, courses(i).credits);
    end
end

%CHOOSE COURSE
course = input('Introduce name of course: ', 's');
choices = [];
credits = 0;
while (isempty(course) == 0)
    for i=1:length(courses)
        if strcmpi(courses(i).course, course) &&
strcmpi(courses(i).degree, degree) && courses(i).english == english
            choices = [choices courses(i)];
            credits = credits + courses(i).credits;
        end
    end
    course = input('Introduce name of course: ', 's');
end

%GENERATE OUTPUT
fid2 = fopen('choices.txt', 'wt');
fprintf(fid2, firstline);
for i = 1:length(choices)
    fprintf(fid2, '%s %s %s %s %s %d\n', choices(i).id,
choices(i).course, choices(i).teacher, choices(i).degree,
choices(i).english, choices(i).credits);
end
fprintf(fid2, 'TOTAL CREDITS: %d', credits);

```



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message and ignore the last selection.

Example of execution:

```

From which degree would you like to choose a course? English
Would you like the course to be in English (Y/N)? Y
These are the courses available according to your criteria:
English: Poetry, Credits: 5
English: Postmodernism, Credits: 6
English: Modernism, Credits: 4
Introduce name of course: Poetry
Introduce name of course: Modernism
Introduce name of course: Poetry
Sorry, you already selected the course Poetry of the degree
English.
Introduce name of course:
File created successfully!

```

Content of *choices.txt* after execution:

| ID | COURSE | TEACHER | DEGREE | ENGLISH | CREDITS |
|----------------|-----------|---------|---------|---------|---------|
| 1004562 | Poetry | Diaz | English | Y | 5 |
| 1004578 | Modernism | Perez | English | Y | 4 |
| TOTAL CREDITS: | | | | | 9 |

SOLUTION

```

clear;
clc;
fid = fopen('courses.txt', 'rt');
if fid < 0
    disp('Error opening file');
else
    %READ FILE AND STORE CONTENTS
    i = 0;
    firstline = fgets(fid);
    while (feof(fid) ==0)
        i = i + 1;
        info = textscan(fid, '%s %s %s %s %s %d', 1);
        courses(i).id = info{1}{1};
        courses(i).course = info{2}{1};
        courses(i).teacher = info{3}{1};
        courses(i).degree = info{4}{1};
        courses(i).english = info{5}{1};
        courses(i).credits = info{6}(1);
    end
end
fclose(fid);

```

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```

degree = input('From which degree would you like to choose a course? ',
's');
english = input('Would you like the course to be in English (Y/N)? ',
's');

%LIST AVAILABLE COURSES
disp('These are the courses available according to your criteria:');
for i = 1:length(courses)
    if strcmpi(courses(i).degree, degree) && courses(i).english ==
english
        fprintf('%s: %s, Credits: %d\n', courses(i).degree,
courses(i).course, courses(i).credits);
    end
end

%CHOOSE COURSE
course = input('Introduce name of course: ', 's');
choices = [];
credits = 0;
while (isempty(course) == 0)
    for i=1:length(courses)
        if strcmpi(courses(i).course, course) &&
strcmpi(courses(i).degree, degree) && courses(i).english == english
            % Check that the course has not been selected already
            bFound = 0;
            j = 0;
            while (bFound == 0) && (j < length(choices))
                j = j + 1;
                if strcmpi(choices(j).course, course)
                    bFound = 1;
                end
            end
            if bFound == 1
                fprintf('Sorry, you already selected the course %s of the
degree %s.\n', choices(j).course, choices(j).degree);
            else
                choices = [choices courses(i)];
                credits = credits + courses(i).credits;
            end
        end
    end
    course = input('Introduce name of course: ', 's');
end

%GENERATE OUTPUT
fid2 = fopen('choices.txt', 'wt');
fprintf(fid2, firstline);
for i = 1:length(choices)
    fprintf(fid2, '%s %s %s %s %s %d\n', choices(i).id,
choices(i).course, choices(i).teacher, choices(i).degree,
choices(i).english, choices(i).credits);
end

```



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Exercise 10

Write a program that creates a file containing a list of offers for Black Friday. The program processes a list of products contained in a file named *products.txt* following this format:

| REF | PRODUCT | BRAND | CATEGORY | PRICE |
|------|------------|----------|----------|---------|
| 1112 | Mouse | XC | IT | 20.00 |
| 6678 | TV | Samsang | Image | 700.20 |
| 6789 | Computer | BlueRang | IT | 3500.00 |
| 2345 | Speaker | Raft | Sound | 430.50 |
| 6782 | VRHeadset | Raft | IT | 600.10 |
| 7763 | Controllor | Namark | Sound | 234.20 |
| 7363 | Tablet | BlueRang | IT | 434.00 |
| 1234 | Computer | Namark | IT | 1199.90 |
| 4522 | Monitor | Samsang | Image | 789.00 |

and a list of discounts to apply contained in a file named *discounts.txt* like this:

| TYPE | NAME | DISCOUNT |
|----------|---------|----------|
| Product | Mouse | 1.00 |
| Category | IT | 5.00 |
| Brand | Samsang | 10.00 |
| Category | Sound | 2.00 |

When the discount type is *Category* the discount should be applied to all the products of the specified category, when the type is *Brand* to all the products of that Brand, if it's *Product* to that specific product. The discounts should be applied in the order that they appear in the file, and the price of a product might be reduced as a result of the application of more than one discount.

The program should generate a file *offers.txt* with a similar format as the file *products.txt* but containing only the products whose prices have been reduced by discounts, and their current price (after applying the discounts).

For example, the file *offers.txt* for the examples of files *products.txt* and *discounts.txt* above should be:

| REF | PRODUCT | BRAND | CATEGORY | PRICE |
|------|------------|----------|----------|---------|
| 1112 | Mouse | XC | IT | 18.81 |
| 6789 | Computer | BlueRang | IT | 3325.00 |
| 2345 | Speaker | Raft | Sound | 421.89 |
| 6782 | VRHeadset | Raft | IT | 570.10 |
| 7763 | Controllor | Namark | Sound | 229.52 |
| 7363 | Tablet | BlueRang | IT | 412.30 |
| 1234 | Computer | Namark | IT | 1139.91 |
| 4522 | Monitor | Samsang | Image | 710.10 |



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```

i = 0;
firstline = fgets(fid);
while (feof(fid)==0)
    i = i + 1;
    info = textscan(fid, '%d %s %s %s %.2f', 1);
    products(i).id = info{1}(1);
    products(i).name = info{2}{1};
    products(i).brand = info{3}{1};
    products(i).category = info{4}{1};
    products(i).price = info{5}(1);
    products(i).newprice = info{5}(1);
end
end
fclose(fid);
disp('Available products:');
for i=1:length(products)
    fprintf('%d %s %s %s %.2f\n', products(i).id, products(i).name,
products(i).brand, products(i).category, products(i).price');
end

fid2 = fopen('discounts.txt', 'rt');
if fid2 < 0
    disp('Error opening file');
else
    i = 0;
    firstline = fgets(fid2);
    while (feof(fid2)==0)
        info = textscan(fid2, '%s %s %.2f', 1);
        discount.type = info{1}{1};
        discount.name = info{2}{1};
        discount.value = info{3}(1);
        for j=1:length(products)
            if ((strcmp(discount.type, 'Product') == 1) &&
(strcmp(products(j).name, discount.name) == 1))
                products(j).newprice = products(j).newprice -
(discount.value*products(j).newprice/100);
            elseif ((strcmp(discount.type, 'Category') == 1) &&
(strcmp(products(j).category, discount.name) == 1))
                products(j).newprice = products(j).newprice -
(discount.value*products(j).newprice/100);
            elseif ((strcmp(discount.type, 'Brand') == 1) &&
(strcmp(products(j).brand, discount.name) == 1))
                products(j).newprice = products(j).newprice -
(discount.value*products(j).newprice/100);
            end
        end
    end
end
fclose(fid2);
fid3 = fopen('offers.txt', 'wt');
if fid3 < 0
    disp('Error opening file');

```



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```

        fprintf(fid3, '\n%d %s %s %s %.2f', products(i).id,
products(i).name, products(i).brand, products(i).category,
products(i).newprice);
        end
    end
end
end
fclose(fid3);

```

Exercise 11

Modify the previous program so that it allows the user to select which discounts to apply. The program offers three types of discounts: by category, by brand and by product. The user selects one of them, and then the program asks again if he/she wants to apply another discount until the user introduces an empty string. Then, the program generates a file *offers.txt* considering only the discounts in the *discounts.txt* file that match the user selection.

Example of execution:

```

** Types of discounts available **
- Product
- Category
- Brand
Introduce which type of discount you want to apply? Product
Introduce which type of discount you want to apply? Brand
Introduce which type of discount you want to apply?

```

Content of the file *offers.txt* after running the program:

| REF | PRODUCT | BRAND | CATEGORY | PRICE |
|------|---------|---------|----------|--------|
| 1112 | Mouse | XC | IT | 19.80 |
| 4522 | Monitor | Samsang | Image | 710.10 |

SOLUTION

```

clear;
clc;
fid = fopen('products.txt', 'rt');
if fid < 0
    disp('Error opening file');
else
    i = 0;
    firstline = fgets(fid);
    while (feof(fid) == 0)
        i = i + 1;
        info = textscan(fid, '%d %s %s %s % 2f', 1);
    end
end

```



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```

for i=1:length(products)
    fprintf('%d %s %s %s %.2f\n', products(i).id, products(i).name,
products(i).brand, products(i).category, products(i).price);
end

disp('** Types of discounts available **');
disp('- Product');
disp('- Category');
disp('- Brand');
sString = input('Introduce which type of discount you want to apply:
','s');
count = 0;
while isempty(sString) == 0
    count = count + 1;
    selection{count} = sString;
    sString = input('Introduce which type of discount you want to apply:
','s');
end

fid2 = fopen('discounts.txt', 'rt');
if fid2 < 0
    disp('Error opening file');
else
    i = 0;
    firstline = fgets(fid2);
    while (feof(fid2) == 0)
        info = textscan(fid2, '%s %s %.2f', 1);
        discount.type = info{1}{1};
        discount.name = info{2}{1};
        discount.value = info{3}(1);
        bFound = 0;
        l = 0;
        while (bFound == 0) && (l < length(selection))
            l = l + 1;
            if strcmpi(selection{l}, discount.type)
                bFound = 1;
            end
        end
        if bFound == 1
            for j=1:length(products)
                if ((strcmp(discount.type, 'Product') == 1) &&
(strcmp(products(j).name, discount.name) == 1))
                    products(j).newprice = products(j).newprice -
(discount.value*products(j).newprice/100);
                elseif ((strcmp(discount.type, 'Category') == 1) &&
(strcmp(products(j).category, discount.name) == 1))
                    products(j).newprice = products(j).newprice -
(discount.value*products(j).newprice/100);
                elseif ((strcmp(discount.type, 'Brand') == 1) &&
(strcmp(products(j).brand, discount.name) == 1))
                    products(j).newprice = products(j).newprice -
(discount.value*products(j).newprice/100);
            end
        end
    end
end

```



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```

else
    bFirst = 1;
    for i=1:length(products)
        if (products(i).newprice ~= products(i).price)
            if (bFirst == 1)
                fprintf(fid3, '%d %s %s %s %.2f', products(i).id,
products(i).name, products(i).brand, products(i).category,
products(i).newprice);
                bFirst = 0;
            else
                fprintf(fid3, '\n%d %s %s %s %.2f', products(i).id,
products(i).name, products(i).brand, products(i).category,
products(i).newprice);
            end
        end
    end
end
end
fclose(fid3);

```

Exercise 12

Write a program that reads from a file named *schools.txt* that lists different dance style courses for two different dance schools, *CityDance* and *DanceCenter*, like this:

| STYLE | LEVEL | TEACHER | SCHOOL | PRICE |
|--------------|--------------|-----------|-------------|-------|
| hiphop | beginner | Perez | CityDance | 70 |
| salsa | advanced | Diaz | CityDance | 80 |
| contemporary | beginner | Aguilar | DanceCenter | 70 |
| breakdance | beginner | Montoya | CityDance | 75 |
| flamenco | intermediate | Sanchez | DanceCenter | 85 |
| hiphop | intermediate | Benavides | DanceCenter | 80 |
| ballet | junior | Mojica | CityDance | 75 |
| contemporary | intermediate | Tormo | CityDance | 85 |
| tapdance | beginner | Montero | DanceCenter | 60 |
| hiphop | beginner | Benavides | DanceCenter | 75 |
| salsa | advanced | Diaz | CityDance | 75 |
| salsa | intermediate | Garcia | DanceCenter | 85 |

The program will generate a file *schoolcourses.txt* containing a list of the available dance styles courses organized per dance school: first all the courses of the school *CityDance*, and next the ones of *DanceCenter*.

Content of *schoolcourses.txt* after execution:

| STYLE | LEVEL | TEACHER | SCHOOL | PRICE |
|------------|----------|---------|-----------|-------|
| hiphop | beginner | Perez | CityDance | 70 |
| salsa | advanced | Diaz | CityDance | 80 |
| breakdance | beginner | Montoya | CityDance | 75 |
| ballet | junior | Mojica | CityDance | 75 |

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SOLUTION

```

clear;
clc;
fid = fopen('schools.txt', 'rt');
fid2 = fopen('schoolcourses.txt', 'wt');
if (fid < 0) || (fid2 < 0)
    disp('Error opening file');
else
    %READ FILE AND STORE CONTENTS
    centers = {'CityDance', 'DanceCenter'};
    i = 0;
    firstline = fgets(fid);
    while (feof(fid) == 0)
        i = i + 1;
        info = textscan(fid, '%s %s %s %s %d', 1);
        schools(i).style = info{1}{1};
        schools(i).level = info{2}{1};
        schools(i).teacher = info{3}{1};
        schools(i).school = info{4}{1};
        schools(i).price = info{5}(1);
    end
end
fclose(fid);
%DISPLAY AVAILABLE STYLES
disp('The dance styles available are:');
fprintf(fid2, 'STYLE\tLEVEL\tTEACHER\tSCHOOL\tPRICE');
for i = 1:2
    fprintf('IN %s:\n', upper(centers{i}));
    for j = 1:length(schools)
        if strcmpi(centers{i}, schools(j).school)
            fprintf('%s - %s - price: %d\n', schools(j).style,
schools(j).level, schools(j).price);
            fprintf(fid2, '\n%s\t%s\t%s\t%s\t%d', schools(j).style,
schools(j).level, schools(j).teacher, schools(j).school,
schools(j).price);
        end
    end
end
fclose(fid2);
disp('File created successfully!');

```

Exercise 13

Modify the previous program so that the program saves the list with courses organized by school and by level (first junior courses, next beginner, next intermediate and next advanced), as in the following example:

Cartagena99.com - Cursos particulares de ciencias para estudiantes de secundaria y bachillerato

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| | | | | |
|----------|--------------|-----------|-------------|----|
| flamenco | intermediate | Sanchez | DanceCenter | 85 |
| hiphop | intermediate | Benavides | DanceCenter | 80 |
| salsa | intermediate | Garcia | DanceCenter | 85 |

SOLUTION

```
clear;
clc;
fid = fopen('schools.txt', 'rt');
fid2 = fopen('schoolcourses.txt', 'wt');
if (fid < 0) || (fid2 < 0)
    disp('Error opening file');
else
    %READ FILE AND STORE CONTENTS
    centers = {'CityDance', 'DanceCenter'};
    levels = {'junior', 'beginner', 'intermediate', 'advanced'};
    i = 0;
    firstline = fgets(fid);
    while (feof(fid) == 0)
        i = i + 1;
        info = textscan(fid, '%s %s %s %s %d', 1);
        schools(i).style = info{1}{1};
        schools(i).level = info{2}{1};
        schools(i).teacher = info{3}{1};
        schools(i).school = info{4}{1};
        schools(i).price = info{5}(1);
    end
end
fclose(fid);
%DISPLAY AVAILABLE STYLES
disp('The dance styles available are:');
fprintf(fid2, 'STYLE\tLEVEL\tTEACHER\tSCHOOL\tPRICE');
for i = 1:2
    fprintf('IN %s:\n', upper(centers{i}));
    for k = 1:length(levels)
        fprintf('LEVEL %s:\n', upper(levels{k}));
        for j = 1:length(schools)
            if (strcmpi(centers{i}, schools(j).school) == 1) &&
                (strcmpi(levels{k}, schools(j).level) == 1)
                fprintf('%s - %s - price: %d\n', schools(j).style,
                    schools(j).level, schools(j).price);
                fprintf(fid2, '\n%s\t%s\t%s\t%s\t%d', schools(j).style,
                    schools(j).level, schools(j).teacher, schools(j).school,
                    schools(j).price);
            end
        end
    end
end
fclose(fid2);
```



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