EE 103
COMPUTATIONAL TOOLS
FOR ELECTRICAL AND EECTONICS ENGINEERING
FINAL EXAM
SOLUTIONS

1) **30 p Write a program that fills an array with random number (from 1 upto 100) of different numbers between two random numbers;**
i.e : an array of length R1 will be filled by numbers which are between R2 and R3 where R1, R2 and R3 are random integer values

```
R1=floor(rand(1)*100)+1;
R2=floor(rand(1)*100)+1;
R3=floor(rand(1)*100)+1;
array(1)=0;
for i=1: R1
new=floor(rand(1)*R2)+1)+(R3-R2);
while myfunction(array,new)
new=floor(rand(1)*R2)+1)+(R3-R2);
end
end

function out=myfunction(in,x)
out=0;
k=1;
while out==0 & k<=length(in)
    if in(k)==x
        out=1;
    else
        k=k+1;
    end
end
```

2) **What does the program below do, explain only with a sentence ?**

```
clear
clc
array=1:3:100
c=0;
f=0;
while(~f)
    if ~myfunction(array,floor(rand(1)*100)+1);
    c=c+1;
    else
    f=1;
    end
end
disp(c)
```

```
function out=myfunction(in,x)
out=0;
k=1;
while out==0 & k<=length(in)
    if in(k)==x
        out=1;
    else
        k=k+1;
    end
end
```

Displays the number of attempts for finding he randomly generated number in the array

3) **The program below tries to list the prime numbers upto a determined number by the user? Please correct the errors if any...**

```
N=input('Enter the value of N');
primes(1)=1;
primes(2)=2;
k=1;            k=3;
for i=1:N       for i=3:N;
    p=1;
for j=1:i-1     for j=3:i-1;
    if mod(i,j)==0
       p=0;
    end
end
if p
    primes(k)=i;
    k=k+1;
end
end
disp(primes)
```

SOLUTIONS

Name Surname:

11.01.2017

ID

EE 103 Final Exam (duration 60 minutes)

For the given programs and their function(s) below, please fill the line(s) with ". . . " to provide the overall program properly. The insertions may require more than a single line

Q1) The program below tries to retrieve a number "N" from the user and create N values between 1-100. Then after plotting them in discrete time, it tries to sort the items in decsending order and plot in the sorted form in the same figure on a seperated subplot

```
clear
clc
N=input('enter a number for N : ')
for i=1:1:N
        [redacted]  array(i) = floor(rand(1)*100)+1;
end
subplot(2,1,1)
stem(array)

for k=1:1:N
for i=1:1:N-1
    if array(i)>array(i+1)
        [redacted]  swap(i,i+1,array);
    end
end
end

subplot(2,1,2)
stem(array)


function array=swap(a,b,array)
temp=mahmut(a);
        [redacted]  mahmut(a) = mahmut(b);
mahmut(b)=temp;
```

Q2) The function called "eleminate_odds" below tries to retrieve an array called " array" and return it back as "yeni" to the caller after eleminating the odd numbers in it.

```
function yeni= eleminate_odds (array)
k=1;
for i=1:1:length(array)
    if mod(array(i),2)~=0
        [redacted]  yeni(k) = array(i)
    end                 k = k+1;
end
```

Q3) The program below tries to eleminate the max element of the array called "dizi"

```
function [enbuyuk,sondizi]=maksimum(dizi)
enbuyuk=dizi(1);
maxindex=1;
for i=1:1:length(dizi)
    if dizi(i)>enbuyuk
        [redacted]        enbuyuk = dizi(i)
        maxindex=i;
    end
end
for i=1:1:length(dizi)
    cnt=1;
    if dizi(i)~=enbuyuk;
        sondizi(cnt)=dizi(i);
        cnt=cnt+1;
    end
    if [redacted]  dizi(i) = enbuyuk
        continue;
    end
end
```

Q4) The program ant the function it used tiry to calculate the transpose of an array

```
for column=1:1:10
    for row =1:1:10
        [redacted]    table(row,column) = row-column
    end
end
table=trans(table)

function array2=trans(array)
for column=1:1:length(array(1,:))
    for row=1:1:length(array(1,:))
        [redacted]
    end      array2(row,column) = array(column,row)
end
```

NAME SURNAME : ID :

EE 103 Computational tools for Electrical and Electronics Engineering Final Exam.

Q1) 30p Please write the outputs of the given programs just to the right hand side of them.

```
clc;
clear;
k=1;
array(1)=0;                                    4 16
for i=1:3:20
    if ~mod(i,4)
        array(k)=i;
        k=k+1;
        if mod(i,3)
            continue;
        end
    end
end
clc
disp(array)
```

```
clc;
clear;
k=1;
array(1)=0;
for i=1:3:20
    if ~mod(i,4)                               4 16
        array(k)=i;
        k=k+1;
    end
end
clc
disp(array)
```

Q2) 30p The program below tries to fill an array with random numbers between 34 and 89 for which the length of it is taken from user, then seperate all the numbers in it to two different arrays such that;

All numbers for which the last digit of the number is greater than or equal to 5 will be listed in array1 and all numbers for which the last digit of the number is less than 5 will be listed in array2. Please find and correct the errors in the program.

```
N=input('Enter a number');
k=1; m=1;
for i=1:N
array(i)=floor(rand(1)*(89-34))+34;
if mod(array(i),2)10)
    evens(k)=i;
m=m+1;
else
    odds(k)=i;
m=m+1;
```

```
end

end
```

Q3) 40p Write a matlab function that genaretes exactly 4 different even numbers between 10 and 50.

```
function myfunc()
array(1)=0;
for i=1:4
x= rand(1)*40+10;
while (varmi(array,x))
x= rand(1)*40+10
end
array(i)=x;
end


function sonuc=varmi(array,x)
sonuc=0;
for i=1:length(array)
if array(i)==x
sonuç=1;
end
end
```

Name Surname : 07.08.2019

ID :

2018-1019

EE 103 Summer Training

Final Questions

1) 40 p Write a Matlab program that finds all numbers from 234 to 2345 that are not prime, last digits are not greater than 3, and they are perfect numbers assuming that the functions;
function perf = perfect(number) and
function prim=prime(number) are already defined, ready to use and they respectively return weather the given number is a perfect number or not and prime or not.

2) 30 p Write what do you see on the screen when you run the program given below?

```
clear
clc
array=[1:3:100]
clc
array1=((mod(array,2)==0).*array);
array2=abc(~(mod(array,2)==0).*array);
disp(array1);
disp(array2);

function array=abc(array)
k=1;
for i=1:length(array)
    if array(i)~=0
        array2(k)=array(i);
        k=k+1;
     end
end
array=array2;
```

3) 30 p What does the given function below return as "res"?

```
function res=myfunction(a,b)
k=1;
while a>=b
c(k)=mod(a,b);
k=k+1;
a=floor(a/b);
end
c(k)=mod(a,b)
res=0;
for i=1:1:length(c)
    res=res+c(length(c)-i+1)*10^(length(c)-i);
end
```

SOLUTIONS

1)

```
for i = 234 : 2345
  if ~(mod(i,10) > 3) & ~prime(i) & perfect(i)
  array(k) = i
  k = k+1
  end
end
```

2)

0 4 0 10 0 16 0 22 0 28 0 34 0 40
0 46 0 52 0 58 0 64 0 70 0 76 0 82
0 88 0 94 0 100

1 7 13 19 25 31 37 43 49 55 61
67 73 79 85 91 97

3) The Base b equavalent of number a

Name Surname : **13th of January 2021**

ID :

2020 – 2021
EE 103 Computational Tools for Electrical and Electronics Engineering
FINAL EXAM

Notes

You have 2 questions in which you will find and correct the errors of them. Each 2 unnecessary change on any part of the program (those yield new error(s)) will cancel 1 true correction for that question. However, the minimum grade from a single question will not be less than 0.

You must understand and correct the given programs and correct the errors there, writing an alternative program that gives the required output will not be accepted. PLEASE ENTER YOUR SOLUTIONS ON THE TABLES GIVEN AT SOLUTIONS PAGE, THE TEXTS WHICH ARE NOT ENTERED ON THE SOLUTIONS PAGE WILL NOT BE EVALUATED. (if you have a printer you can print it out, if you don't have a printer you can draw the tables to a paper at the beginning of the exam

The questions are equally weighted and the total weight of each question will be divided to the number of errors that program has.

QUESTIONS

1) The program below uses the given functions to eliminate all the redundant numbers stored in the array which is taken from the user, (the user continuously enters integer numbers and finally enters -1 to end entering numbers but the lastly entered -1 will not be included in the array) please correct the error(s) if there is/are…

myprogram.m

```
1.    clear
2.    clc
3.    x=-1;
4.    array=[];
5.    while x~=-1
6.    clc;
7.    disp('Enter -1 to end entering new values to    the array');
8.    x=input(' : ');
9.    while x~=-1
10.   array(cnt)=x;
11.   cnt=cnt+1;
12.   end
13.   end
14.   array =eleminate_the_redundant(array)
```

myfunction.m

```
1.    function array=eleminate_the_redundant(array)
2.    for i=1:length(array)
3.    for j=1:i
4.    if array(i)==array(j)
5.    array(i)=-1;
6.    break;
7.    end
8.    end
9.    end
10.   for i=1:length(array)
11.   if array(i)~=-1
12.   array2(k)=array(i);
13.   k=k+1;
14.   end
15.   end
```

2) The function below tries to find and answer to, “What is the list of the numbers that repeat 3 times in a given array?” (e.g : array=[1 2 3 4 5 2 3 4 5 3 4 1 6 2 7] is given to the function and it has 3 values which repeat 3 times (2,3 and 4) so the function will return [2 3 4]) , if there is/are… please correct the error(s) in the given function below

```
1. function res=find_three_times(array)
2. for i=1:length(array)
3. found=0;
4. for j=1:length(array)
5. if array(j)==array(i)
6. found=found+1;
7. end
8. end
9. end
10. for i=1:length(found)
11. if found(i)==2
12. res(cnt)=array(i);
13. cnt=cnt+1;
14. end
15. end
16. eleminate_the_redundant(res); % the given function in Q1 is
    assumed to be corrected
```

SOLUTIONS

S1) The errors on the program can be removed by,

writing	deleting	on line	between the lines	

S2) The errors on the program can be removed by,

writing	deleting	on line	between the lines	

NAME SURNAME : **ID :** **11.01.2022**

2021 – 2022

EE 103 Final Exam

Q1) 33p Please write the output of the program into the box given below…

```
disp(sum(mod(array,2).*(array<5).*array + ~mod(array,2).*(array>=5).*array));
```

Q2) 33p Please write the output of the programinto the box given below.

```
clc;
clear;
a=4;
for i=10:20
        if mod(i,a)
        fprintf('State 1 entered for %d\n',i);
        end
        if ~mod(i,a)
        fprintf('State 2 entered for %d\n',i);
        end
        if mod(i,a)~=0
        fprintf('State 3 entered for %d\n',i);
        end
        if mod(i,a)==0
        fprintf('State 4 entered for %d\n\n\n',i);
        end
        if ~(mod(i,~a))
        fprintf('State 4 entered for %d\n\n\n',i);
        end
end
```

Q3) 34p Please correct the error(s) (if there is/are) in the program below which tries to generate 100 random numbers between 0 and 100 and finds the average of them, it repeats this until the average equals to 50. When the average of them is found to be 50, it stops and displays how many times it generated 100 numbers until it finds the average 50.

```
clc;
clear;
count=0;
while average~=50
    for i=1:100
        array(i)=floor(rand(1)*100)+1;
    end
    average=sum(array)/length(array);
end
fprintf('The average %f is found at %d th attempt \n',average,count);
```

EE 103 LAB Exam

Question 100p

The MATLAB fuction below tries to find the positive square root of a given number please find and correct the errors if there is/are…

```
function res=mysquareroot(n)
step=1;
while ~found==0
    for i=0:step:n
    if (abs(n*n-i))<0.1
        res=i;
        found=1;
        break;
    end
    if ~found
    step=step/10;
    end
    end
end
fprintf('The sqareroot of %d is %f\n',n,i);
```

NAME SURNAME : **ID :** **11.01.2022**

2021 – 2022

EE 103 Final Exam

Q1) 33p Please write the output of the program into the box given below…

```
disp(sum(mod(array,2).*(array<5).*array + ~mod(array,2).*(array>=5).*array));
```

Displays the sum of odd values in the array which are less than 5 and even values in the array which are greater than or equal to 5.

Q2) 33p Please write the output of the programinto the box given below.

```
clc;
clear;
a=4;
for i=10:20
        if mod(i,a)
        fprintf('State 1 entered for %d\n',i);
        end
        if ~mod(i,a)
        fprintf('State 2 entered for %d\n',i);
        end
        if mod(i,a)~=0
        fprintf('State 3 entered for %d\n',i);
        end
        if mod(i,a)==0
        fprintf('State 4 entered for %d\n\n\n',i);
        end
        if ~(mod(i,~a))
        fprintf('State 4 entered for %d\n\n\n',i);
        end
end
```

```
State 1 entered for 13
State 3 entered for 13
State 1 entered for 14
State 3 entered for 14
State 1 entered for 15
State 3 entered for 15
State 2 entered for 16
State 4 entered for 16


State 1 entered for 17
State 3 entered for 17
State 1 entered for 18
State 3 entered for 18
State 1 entered for 19
State 3 entered for 19
State 2 entered for 20
State 4 entered for 20
```

Q3) 34p Please correct the error(s) (if there is/are) in the program below which tries to generate 100 random numbers between 0 and 100 and finds the average of them, it repeats this until the average equals to 50. When the average of them is found to be 50, it stops and displays how many times it generated 100 numbers until it finds the average 50.

```
clc;
clear;
count=0;
while average~=50
    for i=1:100
        array(i)=floor(rand(1)*100)+1;
    end
    average=sum(array)/length(array);
end
fprintf('The average %f is found at %d th attempt \n',average,count);
```

Answer

```
clc;
clear;
count=0;
average=0;
while average~=50
    for i=1:100
        array(i)=floor(rand(1)*101);
    end
    average=sum(array)/length(array);
    count=count+1;
end
fprintf('The average %f  is found at %d th attempt \n',average,count);
```

EE 103 LAB Exam

Question 100p

The MATLAB fuction below tries to find the positive square root of a given number please find and correct the errors if there is/are…

```
function res=mysquareroot(n)
step=1;
while ~found==0
    for i=0:step:n
    if (abs(n*n-i))<0.1
        res=i;
        found=1;
        break;
    end
    if ~found
    step=step/10;
    end
    end
end
fprintf('The sqareroot of %d is %f\n',n,i);
```

```
%2022 final Q3
function res=mysquareroot(n)
found=0;
step=1;
while ~found
    for i=0:step:n
    if (abs(i*i-n))<0.1
        res=i;
        found=1;
        break;
    end
    if found==0
    step=step/10;
    end
    end
end
fprintf('The sqareroot of %d is %f\n',n,res);
```

10.01.2023

2022 – 2023 Fall Final Exam

EE 103 Computational Tools For Electrical and Electronics Engineering

1) Please write a Matlab function that generates a random number among 2, 6, 8, 49 and 138 . (Note : generating a random number from 2 to 138 (e.g) and checking if it is eual to one of these elements is not acceptable, you must directly generate one of these numbers)

```
function res=myfunction
array=[2, 6, 8, 49, 138];
res=array(floor(rand(1)*5)+1);
```

2) lease write with a sentence what does the function below shows on the screen when it is called.

```
function res = myfunction (array)
res=sum((mod(floor(array/10),10)==5).*array)-sum((mod(floor(array/100),10)==5).*array);
disp(res);
```

```
Returns the difference of sum of the numbers for which the 10th
digit is 5 - 100th digit is 5
```

3) The program below tries to write a number in reverse order. Please find and correct the errors in the program below. You can delete/edit/add/replace one/some of the lines if necessary

```
1.  function res=myfunction(in)
2.  clc
    c=1;
3.  while in>0
4.  array(c)=mod(in,10);
5.  in=floorceil(in/10);
    c=c+1;
6.  end
7.  res =0;
8.  for i=length(array):-1:1
9.  res=res+array(i)*10^(length(array)-i);
10. end
```