Lab 2

Contents

1 For loops warm-up

For loop is used for a known number of iterations.

1.1 Hello world 20 times

```
clear;

for i=1:20
    disp('Hello, world!');
end
```

1.2 Hello world with numbers

```
clear;

for i=1:20
    disp('Hello, world!');
    disp(i);
end
```

1.3 Sum of numbers from 1 to 10

```
clear;

to = 10;
sum = 0;

for i = 1:to
    sum = sum + i;
end
```

2 While loops warm-up

While loop repeats code while the condition is true.

```
clear;

n = 5;

while n > 1
    n = n-1;
    disp(n);
end
```

2.1 Infinite loops

Be careful, an infinite loop (it is a loop which never ends on its own) is possible with `while`, for example

```
% This loop will be running forever
clear;

n = 5;

while n > 1 % initially n > 1
    n = n+1; % and we increasing n each iteration,
       hence the loop will never end
    disp(n);
end
```

2.2 break statement

`break` statement stops the loop immediately. No further iterations will be done. This statement works with both `while` and `for` loops.

In the following example we use `break` to exit the infinite cycle.

```
% This loop will be running forever
clear;

n = 5;
while n > 1
    n = n+1;

    if n > 100 % when n > 100
        break % we stop the loop
    end
    disp(n);
end
```

The following code will stop printing after 3 because the loop is terminated when `a == 4`.

```
clear;

for a=1:5
    if a == 4
        break
    end

```

```
    disp(a);
end
```

In the following example the loop stops when the user chooses 0 as the input.

```
clear;
secret = 3;
guess = 0;

while guess ~= secret
    guess = input('Guess my secret number between 1
       and 10 (to exit enter 0 ):');

    if guess == 0
        disp('You chose to exit.');
        break
    end

    if guess == secret
        disp('Correct!');
    else
        disp('Try again >>');
    end
end
```

Also this program can be implemented using infinite loops:

```
clear;
secret = 3;
guess = 0;

while 1 == 1 %force the loop to be infinite
    guess = input('Guess my secret number between 1
       and 10 (to exit enter 0 ):');

    if guess == 0
        disp('You chose to exit.');
        break
    end

    if guess == secret
```

```
14          disp('Correct!');
15          break
16      else
17          disp('Try again >>');
18      end
19  end
```

2.3 continue statement

`continue` statement allows to skip the rest part of the code in current iteration and to go to the next iteration of the loop. This statement works with both `while` and `for` loops.

In the following example "Hello, world!" text will not be printed, because `continue` is the first statement in the for loop.

```
1  clear;
2
3  for a=1:5
4      continue
5
6      disp('Hello, world!');
7  end
```

And the following code will print "Hello, world!" 5 times and "Good bye, world!" only 3 times because of the `continue` command before the second `disp` command.

```
1  clear;
2
3  for a=1:5
4      disp('Hello, world!');
5
6      if a > 3
7          continue
8      end
9
10     disp('Good bye, world!');
11 end
```

3 Task 2.1

Write a script which asks the user to enter a number exactly 5 times. Use `for` loop! For each number the script should print to the screen whether it is even or odd.

4 Task 2.2

Write a script which asks the user to enter a number until the user enters 0. For each number it prints to the screen whether it is positive or negative.

5 Task 2.3

Implement Euclidean GCD algorithm from lecture 1 slides (see pseudocode on slide 19) in Matlab.

`https://docs.google.com/presentation/d/1JmBCX4HxZN_ew7aiV_9u22gqHRt9NbIBw4Ag9ke1k7o/present#slide=id.p19`

Test it properly several times with different values of a and b, e.g., 25 and 15, 252 and 105, and so on. Make sure it works correctly and as expected.

6 Task 2.4

Write a program which prints lyrics of a Swedish version of the song "99 bottles of beer".

The lyrics of the song are as follows:

```
99 bottles of mjölk on the wall, 99 bottles of mjölk.
Take one down, pass it around, 98 bottles of mjölk on the wall

98 bottles of mjölk on the wall, 98 bottles of mjölk.
Take one down, pass it around, 97 bottles of mjölk on the wall

...

No more bottles of mjölk on the wall, no more bottles of mjölk.
We've taken them down and passed them around; now we're healthy and strong!
```

Hint: to print a line of text with a number you can use `num2str()` function as follows.

```
bottles = 99;

disp([num2str(bottles) ' bottles of mjölk,' num2str(bottles) ' bottles of mjölk.']);
```

This code will print a string "99 bottles of mjölk on the wall, 99 bottles of mjölk.". Do not forget to replace variable `bottles` with your variable name. Print the second line using the same approach.