Exercise 5

General instructions: Follow these instructions as they facilitate the revision of the exercises. The review takes into account that you always use the requested file names. Send only the files requested. Return your answers to your assistant as an email entitled TilaI,2017
If you have not programmed before, choose only one of the programming languages (**octave**/**python**) don't change it during the course. If you are sure that you want to try both languages, you can of course do the exercises of both languages. However return the exercises to your assistant in one langugage only.

- **Exercise 5a:** Do either **python** or **octave** part (NOT BOTH!).

python part

Go to your directory `/home/username/ohjelmat/`
From course webpage copy **python** program `H5akesken.py`
Run the program using command `python H5akesken.py`
Random text that is printed can look something like:

```
Arvottu luku  0.5639691192125237
on alueen (0,1) keskella
Arvottu kulma = 4456.960178005686  astetta
```

The result is different in every run, because `x=ra.uniform(0,1)` generates a random number `x` between (0,1) and `a=10000.0*ra.uniform(0,1)` generates a random angle `a` between (0,10000) degrees. Control structures `if`, `elseif` and `else` will recognize whether the number `x` is in the beginning, middle or end of the range (0,1).

Copy the program `H5akesken.py` to a new program `H5avalmis.py`. Using control structures `if`, `elseif` and `else`, below line `# Tehtava alkaa tasta ===` create code so that program `H5avalmis.py` will recognize in which quarter of the unit circle point $(\cos a, \sin a)$ is located? Whe you run the program using command `python H5avalmis.py`, text displayed should look close to

```
Arvottu luku  0.8789332830850382
on alueen (0,1) lopussa
Arvottu kulma = 9610.601333054961  astetta
on 3. neljanneksessa
```

Requirement of the exercise: Program `H5avalmis.py` is ready, when the content of the output is similar to the example above, and the program does not crash with the command `python H5avalmis.py`
Note: Use radians (not degrees) in trigonometric functions, or you lose one point.

octave part

Move to your directory `/home/username/ohjelmat/`
From course webpage copy **octave** program `H5akesken.m`
Run program using command `octave H5akesken.m`
Text printed looks something like:

```
 Arvottu luku = 0.4972
on alueen (0,1) keskella
Arvottu kulma = 1790.5939 astetta
```

Results differ between runs because command `x=rand(1);` generates a random number `x` between (0,1) and command `a=10000.0*rand(1);` generates a random angle `a` between (0,10000) degrees. Control structures `if`, `elseif`, `else` and `endif` recognize whether `x` is in the beginning, middle or end of the (0,1) range.

Copy program `H5akesken.m` to a new program `H5avalmis.m`.

Using control structures `if`, `elseif`, `else endif` below line `# Tehtava alkaa tasta ===` create code so that program `H5avalmis.m` recognizes in which quarter of the unit circle point $(\cos a, \sin a)$ is located.

When you run the program using command `octave H5avalmis.m`, text printed should be close to

```
 Arvottu luku = 0.2338
on alueen (0,1) alussa
Arvottu kulma = 5374.2654 astetta
on 4. neljanneksessa
```

Requirement of the exercise : Program `H5avalmis.m` is ready, when the content of the output is similar to the example above, and the program does not crash with the command `octave H5avalmis.m`
Note: Use radians (not degrees) in trigonometric functions, or you lose one point.

- **Exercise 5b:** Do either **python** or **octave** part.

python part

Move in your directory `/home/username/ohjelmat/`
From course webpage copy **python** program `H5bkesken.py`.
Copy `H5bkesken.py` to new program. `H5bvalmis.py`.
Program crashes, when you run it using command `python H5bvalmis.py`.
Edit program so that when running command `python H5bvalmis.py` it prints rows

```
0
3
6
9
12
j= 20
j= 17
j= 14
j= 11
```

Requirement of the exercise: Program `H5bvalmis.py` is ready, when the content of the output is similar to the example above, and the program does not crash with the command `python H5bvalmis.py`

octave part

Move in your directory `/home/username/ohjelmat/`
From course webpage copy **python** program `H5bkesken.m`.
Copy program `H5bkesken.m` to new program. `H5bvalmis.m`.
Program crashes when you run it using command `octave H5bvalmis.m`.
Edit program so that using command `octave H5bvalmis.m` prints rows

```
0
3
6
9
12
j=20
j=17
j=14
j=11
```

Requirement of the exercise: Program `H5bvalmis.m` is ready, when the content of the output is similar to the example above, and the program does not crash with the command `octave H5bvalmis.m`

Turning in the exercises
Send your assistant following files attached to the e-mail:
H5a: `H5avalmis.py` or `H5avalmis.m`
H5b: `H5bvalmis.py` or `H5bvalmis.m`