Return as an email attachment to taneli.kalvas@jyu.fi no later than 7 February at 12:15 (before lecture). The email title should include FYSY115/Harjoitus 2. If the exercises are made with a partner include the names of the team.

Make each exercise to its own script/function file.

1. Write a function file, which takes two scalar arguments x and y. The function returns $\exp(-y/z)\,\sin(x)$, where z is a global variable defined outside the function.

2. Write a skript file, which asks how long and what is the weight of the user is in centimeters and kilograms. Using formatted output print out the length in meters and centimeters and the weight in kilograms and grams together with the body mass index. Print in form "Length = XX m = YY cm" ja "Weight = ZZ kg = WW g" and "BMI = TT kg/m^2" with each statement on it's own line.

3. Write a function file, which receives a single argument `N`. The function returns a $2 \times N$ matrix, with angles from zero to 2π on the first row and the same angles in degrees on the second row. Tip: Start by producing a vector with colon-operator or `linspace`.

4. Write a script file in which you define an anonymous function

$$f(x) = -\exp(-x^2)\cos^2(7x-1)\,.$$

Present the function graphically near zero. Find the locations of the two deepest valleys using the `fminunc` method.

5. Write a script file, which simulates throwing two 6-sided dice 100 times using the `randi` method. Sum the results of the dice together to produce 100 values between 2 and 12. Make statistics of the value in a histogram and present it graphically. Tip: Start by producing the random numbers in a 2×100 matrix and use the sum-function.

6. Write a function file, which receives a single scalar argument x and returns $x^2 - 3$ if x is even and -1 otherwise.

7. Write a script file, where you define an anonymous function

$$f(x) = e^{-x} - e^{-2x} + \frac{1}{20}x - \frac{1}{4}.$$

Solve the three roots of the function using the `fzero` method. Present the result graphically meaning that you should plot the function using a blue line and the roots with red circles Tip: Save the roots into a 3-dimensional vector x. The y-vector is [0 0 0].