A picture containing outdoor, object, clock, sitting

Description automatically generated

A guide to the course

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# Introduction

Welcome to the *Introduction to the Computational Science*course by School of Energy Systems! My name is IK and I will guide you through the course.

Programming is literacy of the XXI century. Without programming we would not live in the world as it is now. Software is used everywhere and for various purposes, starting from clocks on your phone to controlling spaceships. For us, as engineers, it is useful tool for controlling and designing of the mechanical systems.

During the course you will need only a computer I strongly recommend to use your own computer, because it will make studying easier. Before starting the course

## Structure of the course

We will cover following topics:

* Syntax
* Files System
* Version Control
* Best Coding Practices
* Variables
* Python Objects (String, Dictionary, Tuple, Sequence, Set, Lists)
* Control Flow (Boolean Expressions/Operators, If, Else, Else If)
* Loops (For, While),
* Functions
* Classes
* Matlab Introduction (optional)

## Grading

## Project

What is programming language?

What types of programming languages there are?

Why Python?

Welcome to the students, including introducing yourself, your title and field of expertise•

Course number/name and how the course fits into the curriculum of the program

•The importance or reason for this course

•How or why this course is relevant to the students

•How the course is designed / organized and will be delivered to students

•How/why the course design will help the students achieve the course goals and learningobjectives

•Expectations for student participation

•Special instructions for assessments or assignments

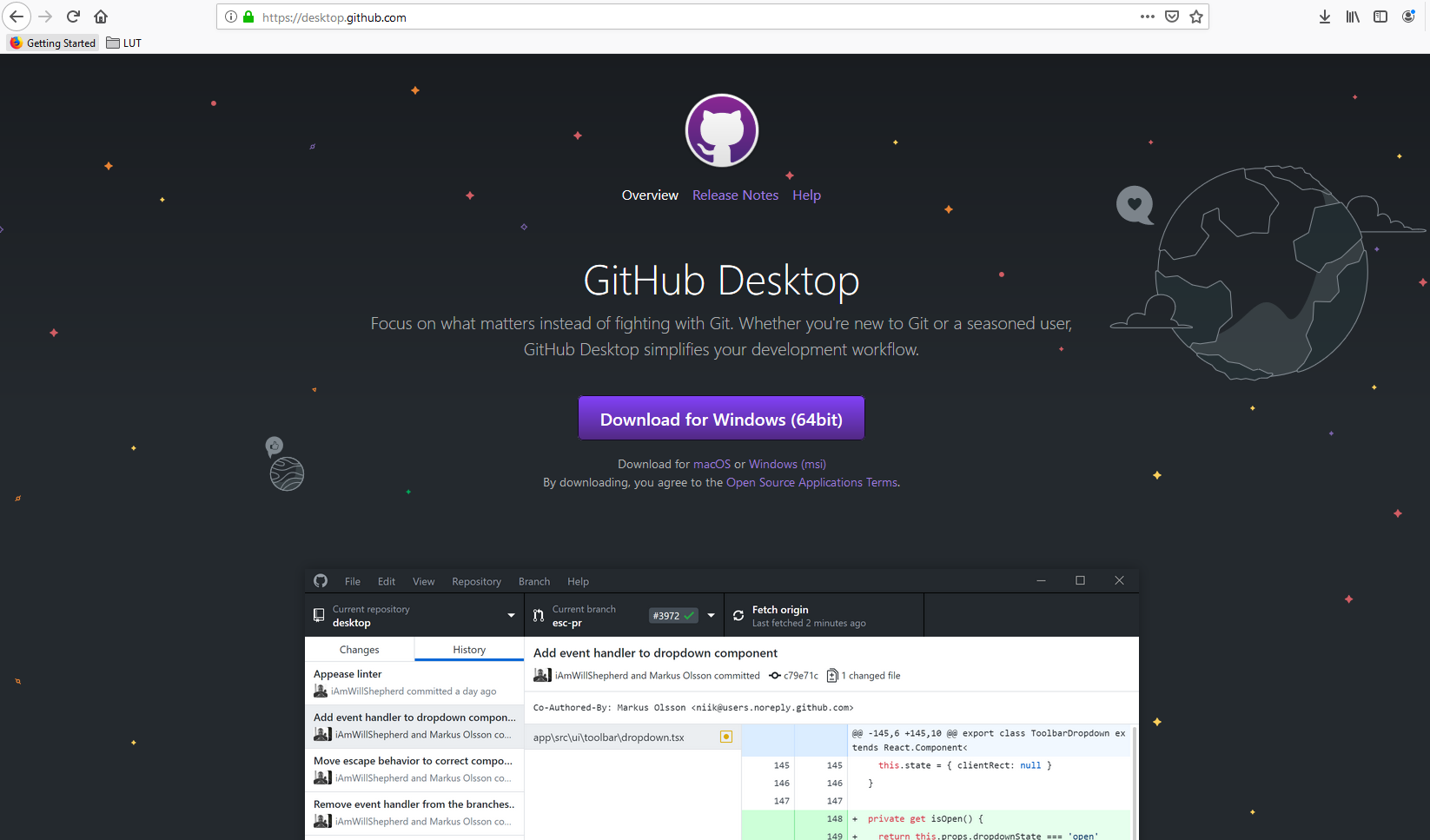
# Installation

## Installation of Anaconda

## Preparing Github

To install Github on LUT computer do following steps:

Step 1: Download Github Desktop from [GitHub Desktop download page](https://desktop.github.com/). Click download, save installation file and run it.



Step 2: Create Github account or login if you have one.

# Version Control

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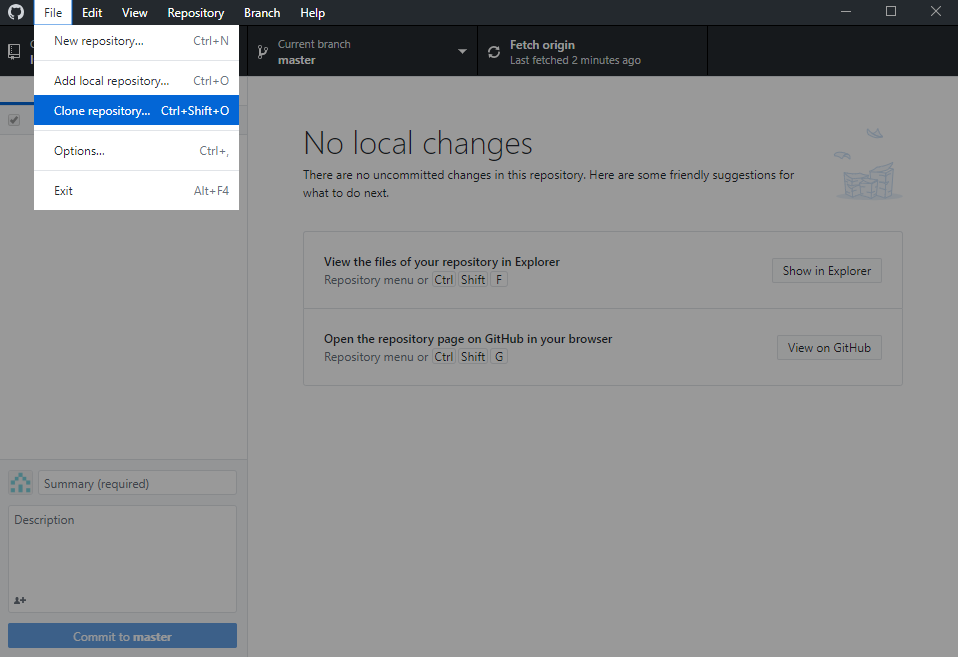
## What is Github?

GitHub is a platform for version control and collaborative work on code. It allows team of developers to work on the same project and track what was done before.

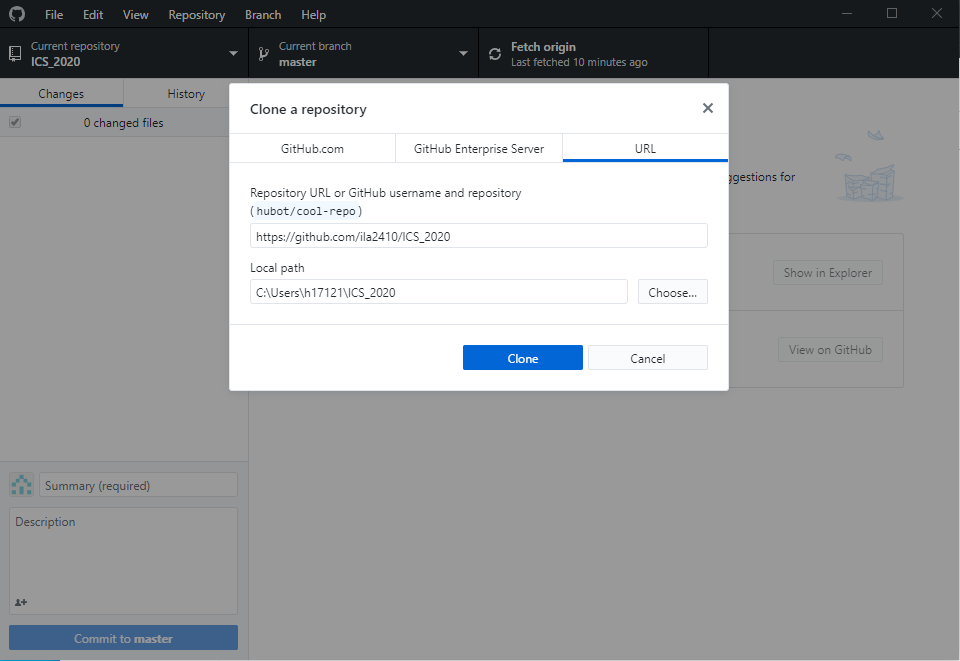
## Cloning Github repository

During this course all materials and assignment are located at the course Github repository. You should clone the repository using Github Desktop. You can clone repository by following these steps:

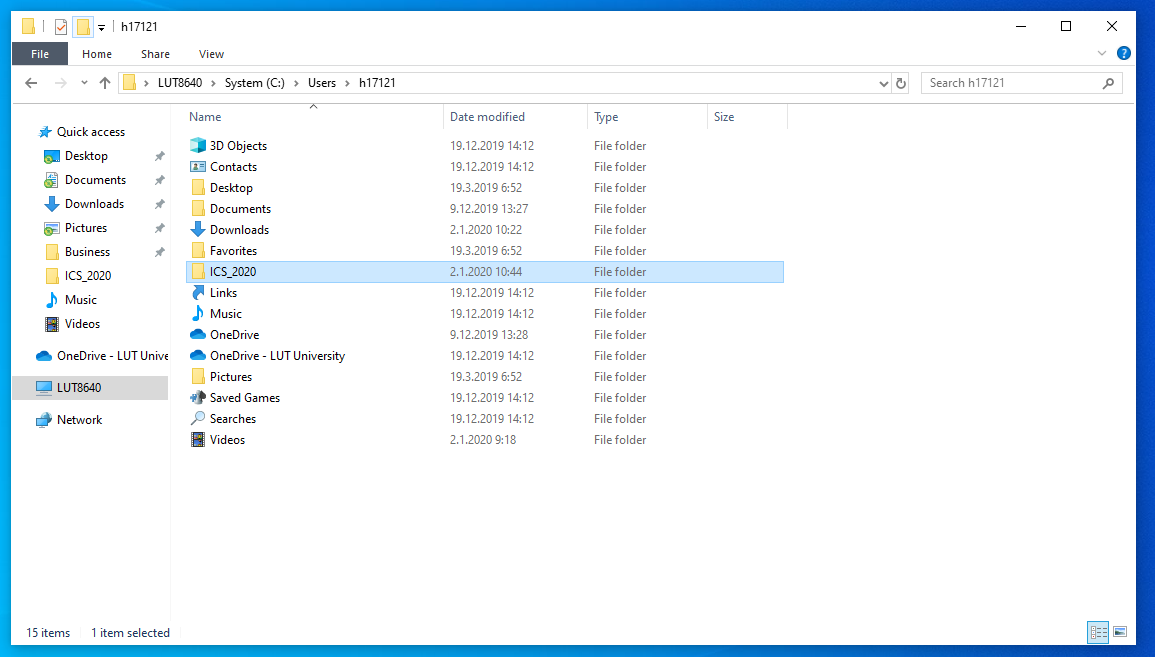
Step 1: Open Github Desktop. Go to File🡪Clone repository



Step 2: Go to URL tab, put URL of the repository (<https://github.com/ila2410/ICS_2020>) and choose path where to clone it. Then click clone button. **WARNING! If you are using LUT computer save to your C:\Users\your\_user\_number (for example C:\Users\n5198) folder, otherwise, it would not save anything.**



Step 3: Open File Explorer and go to the path. Now you will have all needed materials.



## How to work in groups

# Best Coding Practices

Pseudocode

# Syntax

# Operators

## Arithmetic operators

## Comparison operators

These operators compare the values on either side of them and decide the relation among them. They are also called Relational operators.

## Assignment operators

## Logical operators

## Other operators

# Data types

A data in the real world can be represented by numerical and text data.

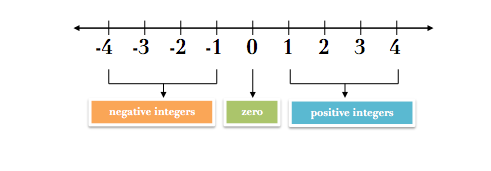
## Boolean

True or false

## Numerical values

Python supports four different numerical types: integers(int), float, long and complex.

Integers are whole numbers, which can be negative or equal to zero, as shown at the figure below.



You can initialize integer number as follows:

float (floating point real values)

complex (complex numbers)

## String

# Objects

## List

## Tuple

## Set

## Dictionary

## Data Type Conversion

# Control Flow (

## Boolean Expressions

## If – Else

## ElseIf

# Loops

## For loop

## While loop

# Functions

# Classes

# Matlab Introduction