**Gurobi and Python Getting Started**

**Python** <https://www.python.org/downloads/>. Download the installer .EXE file and run it.

The Python app opens its own command window. To start Python from a command shell:

- The path to the python must be in the “environment paths”. Jonathan fixed this for me.   
- Open the Command Prompt app (CMD will find it in the Windows search bar)

- Type “python".  The prompt changes to ">>>"

- Not working: “pip” for installing modules in Command Prompt:

pip install csv math time numpy pandas

These are the modules used in Silas’s code. Some were already installed. We installed the rest.

- Can call pip in python:

>>>python -m pip install …

Although “pip” is working in python, none of the modules are found by this command.

Running

In Command Prompt: Type, e.g.,

python C:\Users\Mike.Veatch\Documents\My\_Gurobi\fn.py

To quit, type "exit()"

Can also run in app?

Text editor: A good one is Visual studio <https://code.visualstudio.com/download>.

**Installing Gurobi Python**

Assuming you have Python,

1. Download Gurobi from <https://gurobi.com/downloads/> You need the Gurobi Optimizer.  You will need to register.
2. Set up your Gurobi license (see below).
3. Install the Python module with "pip install gurobipy". Since pip isn’t working in Command Prompt, use " python -m pip install gurobipy"
4. Insert the following at the beginning of your python program

import gurobipy as gp

from gurobipy import GRB

and any other modules needed.

Now the python program can call Gurobi.

There’s also a file setup.py (in C:\gurobi951\win64)

# This script installs the gurobi module in your local environment, allowing

# you to say 'import gurobipy' from the Python shell.

# To install the Gurobi libraries, type 'python setup.py install'.

**Gurobi site license**

Create a token server client license. It is a plain text file created with NotePad, WordPad, etc.

Name: gurobi.lic

Location: a default location for your computer, e.g., C:\Users\Mike.Veatch\Documents

Contents: TOKENSERVER=gurobi.gordon.edu

or

TOKENSERVER=172.27.43.55

but this IP address may not be permanent.

*You must be on the Gordon network (on campus or VPN) to use this license.*

For testing, you may want to add a line that change the timeout in case the token server is unavailable. The default value is 30 seconds.

SERVERTIMEOUT=10

This was set up by Ronnie Sinclair in CTS. More info:

<https://www.gurobi.com/documentation/9.5/quickstart_windows/creating_a_token_server_cl.html#subsection:clientlicensetoken>

**Gurobi Individual license**

<https://www.gurobi.com/academia/academic-program-and-licenses/> explains how to get an academic license, and get and install your license key. **Doesn’t work** b/c Gordon’s external IP’s resolve to a comcastbusiness.net domain name and not an .edu domain.

**Gurobi programming notes**

**Warm start**: each call of Gurobi to solve the LP should use the previous optimal solution (or it may run too slow). To make this easier, instead of rewriting the model each iteration, I modify existing constraints and objective. Since the list of constraints and variables stays the same, Gurobi can automatically use the warm start. The constraint coefficients, constraint RHS, and objective coefficients may change and still use a warm start. Gurobi documentation is confusing <https://www.gurobi.com/documentation/9.5/refman/pstart.html#attr:PStart>

this is clearer: <https://www.gurobi.com/documentation/9.5/refman/start.html>

I assume that Addconstrs(…, “C”), where C is an existing constraint, replaces the constraint and allows warm start. I know that setObjective works this way.

**Variable coefficients**

I assume that when the coefficients are python variables, e.g.,

a.setObjective(C[0]\*x[0] + C[1]\*x[1], GRB.MAXIMIZE)

and those variables C[0], C[1] are updated, the model is NOT updated. I believe the model uses the VALUES of these variables (when the .Add statements are executed) to define the model.