Student Project Activity #0: **Installation and Basic Concepts**

Overview:

The purpose of this first activity is to install and test the URBANopt software while also learning about the concepts of Urban Building Energy Modeling (UBEM). The student will also create an environment variable for their API key which will allow the use of the REopt tool later in the project.

Tasks:

1. (30 mins) Install URBANopt: Follow this link to the URBANopt "Getting Started" page. Familiarize yourself with the page and follow the directions for "install with the URBANopt installer": https://docs.urbanopt.net/installation/installation.html

2. (1 min) Test URBANopt installation: Run this "help" command in Git Bash:

   uo -h

   a. This will output a help menu with a list of commands available in URBANopt and the version number (take a screenshot)

3. (5 mins) Request/Apply an API Key: https://developer.nrel.gov/signup/ .
   Do not wait until the last minute to request an API key, as it can take some time to receive it.
   a. Request an API key using the link above
   b. In the box labeled: "How will you use the APIs" enter: URBANopt class project
   c. This API key will be sent to your email
   d. In windows:
      i. In the windows search bar search and go to: "edit environment variables for your account"
      ii. Select "new"
      iii. Variable Name: "GEM_DEVELOPER_KEY"
      iv. Variable Value: "<insert your API key>"
   e. In Mac:
      i. Go to the user directory and find a bash_profile file: ~/.bash_profile
      ii. Open the file and add this line: export GEM_DEVELOPER_KEY=<WHATEVER THE API KEY IS>
      iii. Save the file and reload the terminal
      iv. Type "env" in the terminal to verify that the variable is set

4. (60 mins) Write a Report: Review online documentation and scientific papers to prepare a 1-page written response to the following UBEM questions:
   a. What is Urban Building Energy Modeling (UBEM) and how is it different from individual building energy modeling? What are its capabilities and limitations?
   b. What is Grid-interactive Efficient Buildings (GEB)?
   c. For which GEB objectives might UBEM provide insights beyond individual building energy modeling?
   d. What is URBANopt(provide a brief description)? Briefly describe the objects that URBANopt defines: What is a Feature, FeatureFile, Scenario, Scenario File ?

Selected References:

- [Modeling Urban Building Energy Use: A Review of Modeling Approaches and Procedures](#)
- [Grid-interactive efficient Buildings Technical Report Series: Overview of Research Challenges and Gaps](#)
- [URBANopt: An Open-Source Software Development Kit for Community and Urban District Energy Modeling](#)
- https://docs.urbanopt.net/
- https://docs.urbanopt.net/resources/definitions.html

Deliverables: (Week 1)

o Screenshot of the terminal after running "`uo -h`"

o Screenshot showing the value of your API key

o A 1-page report as stated in Task #4