**Basic Programming Workshop**

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**Overview:** The workshop will run from January 10th – 12th before spring classes begin. The three-day workshop will provide the students with no prior experience with the basic programming skills required to take full advantage of YSE course offerings. The workshop will heavily focus on the programming language R, but it will introduce students to version control with GitHub (something that should be used with any programming project) and introduce students to Python (to demonstrate that the key concepts hold across any programming language).

Each day will consist of two lectures in the morning (60-80 minutes with a 30-minute break between), a mini problem set to practice the skills being learned, and open office hours in the afternoon for students to ask clarifying questions.

**Outline**

* **Day One**
  + **Thinking Like a Computer:** Write pseudo code, a necessary first step for any successful programming task and useful for collaborative projects.
  + **R Studio and Base R:** Familiarize with R-Studio’s user interface, how to create, write, and run R scripts, and learn basic data objects, functions, and loops.
* **Day Two**
  + **Data Manipulation (tidyverse):** Learn basic skills for cleaning, manipulating, and constructing new variables from existing variables.
  + **Data Visualization (ggplot):** Learn basic plot-making skills and best practices for labeling and titling.
* **Day Three**
  + **Collaboration and version control (GitHub):** Create and learn how to use version control so code can be shared and collaboratively written.
  + **Programming is Programming (Python):** Return to base concepts seen on day one; note that they are extremely similar in any programming language. Take away that once you know one programming language, others are not intimidating.

Data analysis is notably absent from the workshop. Data analysis is field-specific, and there are many excellent courses on data analysis at YSE and Yale. This workshop will not replicate their work but instead get students up to speed so they feel more confident taking advantage of the analysis courses offered.