

1 Introduction

The goal of this module is to learn how to program in Python. Students who successfully complete the module will be able to tackle computational tasks that they encounter in subsequent modules in this course. Students will create, run, and debug Python programs using the PyCharm integrated development environment (IDE). In the process, they will also become familiar with the command-line interface.

2 Learning Outcomes

- Proficiency in the implementation of Python programs of moderate size and complexity using the core libraries and data types.
- Familiarity with an IDE and the command-line interface.

3 Topics Covered

- Lecture 1 (*Your First Programs*): the Python workflow; standard output; command-line input; and errors in a program. Programs discussed: `helloworld.py`, `useargument.py`.
- Lecture 2 (*Basic Data Types*): `str`, `int`, `float`, and `bool` types; expressions; import, function-call, and assignment statements; operator precedence; and Python console. Programs discussed: `dateformats.py`, `sumofsquares.py`, `quadratic.py`, `leapyear.py`.
- Lecture 3 (*Control Flow*): branch (if) statement; conditional expression; loop (while and for) statements; nesting; variable scope; and program tracing. Programs discussed: `grade.py`, `flip.py`, `nhellos.py`, `powersoftwo.py`, `divisorpattern.py`, `harmonic.py`, `sqrt.py`, `gambler.py`.
- Lecture 4 (*Collection Data Types*): `list`, `tuple`, `set`, and `dict` types; and advanced looping techniques. Programs discussed: `sample.py`, `couponcollector.py`, `selfavoid.py`.
- Lecture 5 (*Functions and Objects*): defining functions; `filter`, `lambda`, and `map` functions; objects and methods; basic and collection data types revisited; standard input; redirection and piping; and file input and output. Programs discussed: `harmonicredux.py`, `couponcollectorredux.py`, `gaussiantable.py`, `gaussian.py`, `potentialgene.py`, `randomseq.py`, `average.py`, `cat.py`, `split.py`.

4 Grading

To receive a passing grade for the module, students must complete the programming assignments with an average score of at least 60%.

Programming Assignments:

#	Title
1	Basic Data Types
2	Control Flow
3	Collection Data Types
4	Functions and Objects