# Unit 1 The World of Computer Science

## Learning objectives

1. Explain what CS is, and why it is more than just computer programming.
2. Give examples of computing tasks that arise in
   1. everyday life (e.g. counting out change)
   2. mathematics (e.g. solving a linear system)
   3. technology design (e.g. determining if a phone is roaming)
3. Design algorithms for familiar computing tasks and implement them in pseudocode.
4. Determine whether algorithms for familiar tasks written in pseudocode are correct, i.e. are guaranteed to generate the desired output on all allowable inputs.
5. Describe the goals and benefits of major subfields of computer science, such as bioinformatics, artificial intelligence, and computer-human interaction.
6. List several major programming languages in use today.
7. Explain the difference between
   1. compiled and interpreted languages
   2. applications, operating systems and IDEs

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| **Lesson** | **Content** | **Assignment** |
| **Lesson 1** What is CS? | - Introducing ourselves  - Course info letter and FAQ letter  - Mini-Lesson: Restaurant Science vs. Computer Sci. - Edmodo Scavenger Hunt | Homework #1-1 |
| **Lesson 2** Algorithms in everyday life | - Algorithms you already know  - Tasks expressed as inputs and outputs  - Pseudocode algorithms for 3 common tasks:  -- Wolf-sheep cabbage problem  -- Starting a car  -- Setting the table - Watch video “The Four Types of Computer Scientists” | Homework #1-2 |

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| **Lesson 3** Algorithms in computing | - Nested decision structures: Red-Blue Dye  - Mathematical algorithms used in tech.:  --Cell phone towers  --GCD  --Solving a linear system by elimination | Start Homework #1-3 |
| **Lesson 4**  Algorithm correctness | - What makes a good algorithm:  - correctness  - completeness  - efficiency  - Picking the best algorithm from several choices - Begin Logic Lab | Finish Homework #1-3 |
| **Lesson 5** Logic lab | - Finish Logic Lab |  |
| **Lesson 6** Programming languages | - Common programming languages used today  - What programming languages are  - Demo of Python, Java, and Maple  - Are computers “smart”?  - Compiling vs. interpreting  - Three types of software  - Application software  - Operating systems  - IDEs  - Python IDE basics | Homework #1-4 |
| **Lesson 7** Subfields and applications of computer science | - Examples: computer algebra and operations research  - **Begin Assignment 1**  - Group share | **Work on Assignment 1** |