FOUNDATIONS FOR QUANTUM PROGRAMMING

Course Description

Foundations for Quantum Programming is an optional prerequisite for the Quantum Programming Core training. This self-paced, online course supports the math and Python skills needed to successfully complete Quantum Programming Core and use D-Wave annealing quantum computers to solve optimization problems. Learners who successfully complete this course will better understand how to determine optimization problem objectives, define problem variables, and represent problems mathematically, graphically, and programmatically.

Course materials include recorded presentations, quizzes, and programming activities. The course requires about 10 hours total to complete. Learners have access to the course for six months (180 days) from the date of registration.

Learning Objectives

After successfully completing this course, you will be able to:

- **Identify optimization problem objectives and variables.**
- **Represent problem objectives as math expressions.**
- **Represent problem constraints as equalities and inequalities.**
- **Convert problem constraints to penalty expressions.**
- **Combine optimization problem objectives and constraints into an appropriate QUBO function.**
- **Represent algebraic functions graphically and using matrices.**
- **Write basic Python programs to represent, setup, and organize optimization problems.**

Prerequisites

There are no prerequisite courses to complete before starting this training.

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Course Agenda

After registration, learners have access to the course for six months (180 days). Most learners report spending about 10 hours to complete the course.

We recommend the following sequence to complete the course most effectively:

MODULE 1: Course Overview

- Welcome and Syllabus
- How Math is Used in Programming Annealing Quantum Computers

MODULE 2: Problem Variables

- Introduction to Variables
- Math Symbols
- Working with Variables

MODULE 3: Math Used in Problem Formulation

- Truth Tables
- Quadratic Models
- Summations

MODULE 4: Math Used in Formulating Problem Constraints

- Introduction to Constraints
- QUBOs
- Combining Problem Objectives and Constraints

MODULE 5: Ways to Represent Optimization Problems

- Representing Problems Graphically
- Representing Problems Using Matrices

MODULE 6: Represent Optimization Problems in Code

- Programming Tools
- Store Problem Data
- Setup Problem Operations
- Organize Code

Registration

For more information and pricing details, please visit https://training.dwavequantum.com

For assistance, contact training@dwavesys.com