St Petersburg University

Introduction to Introduction

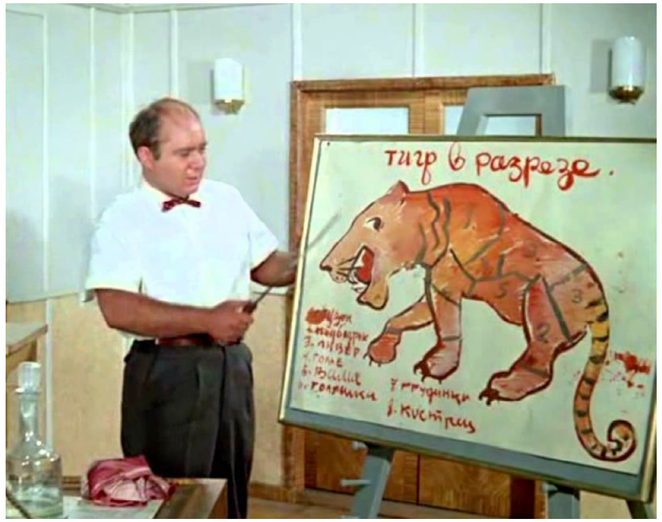
Sergey S. Sysoev

PhD, Associate Professor

Week Plan

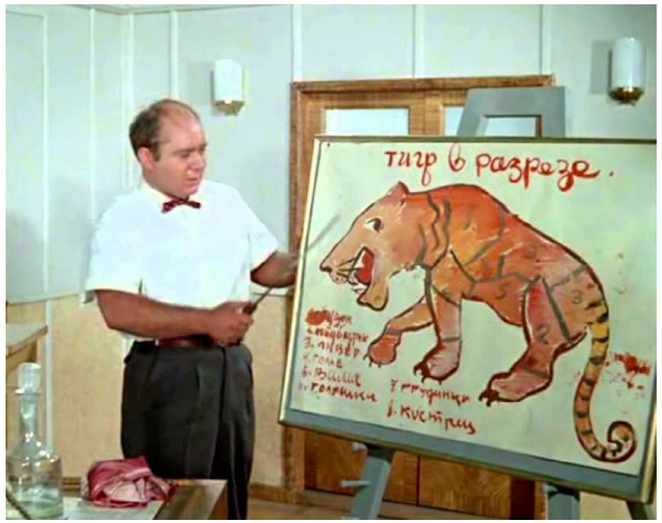
- Learning objectives
- Computation. Information
- Computational system characteristics
- The goal of computations. Universality. Algorithm
- Computational Complexity
- Quantum computing
- Quantum effects
- The Multiverse interpretation of quantum mechanics

What is this Course About?



Frame from film “Striped cruise”
Directed by Vladimir Fetin

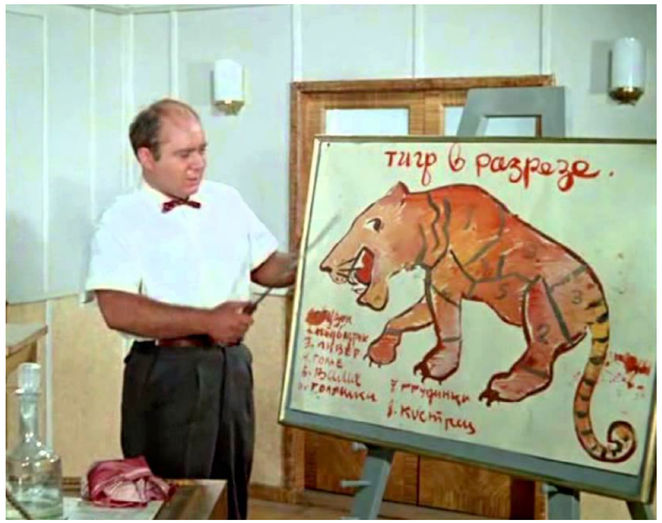
What is this Course About?



Frame from film “Striped cruise”
Directed by Vladimir Fetin

1. ~~Quantum Mechanics~~

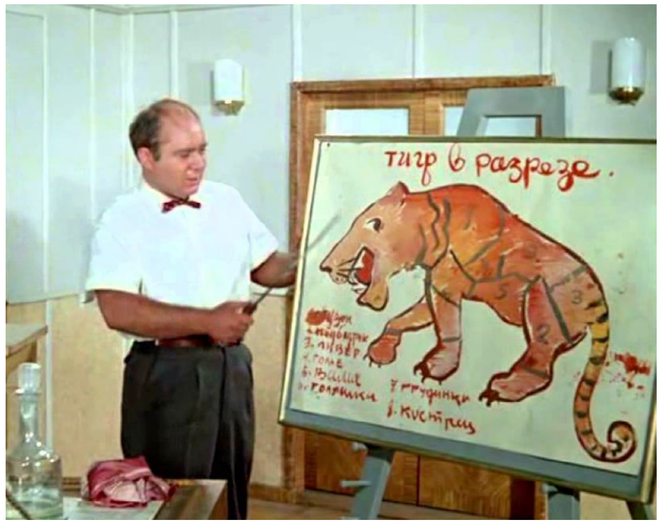
What is this Course About?



Frame from film “Striped cruise”
Directed by Vladimir Fetin

1. Quantum Mechanics
2. Software Engineering

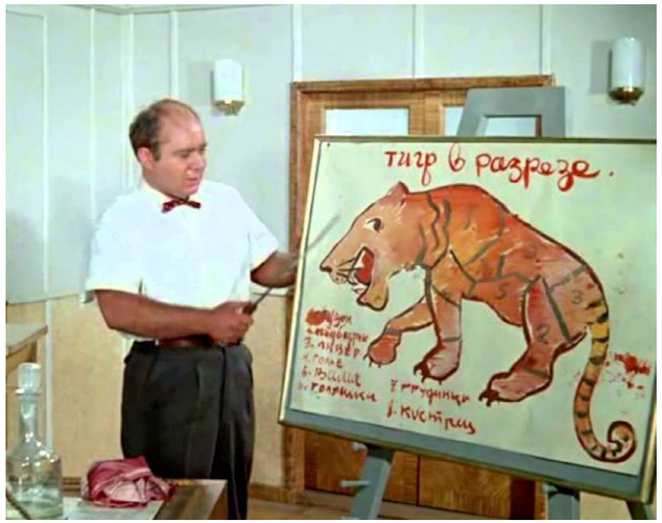
What is this Course About?



Frame from film “Striped cruise”
Directed by Vladimir Fetin

1. ~~Quantum Mechanics~~
2. ~~Software Engineering~~
3. Mathematical Model of Quantum Computations

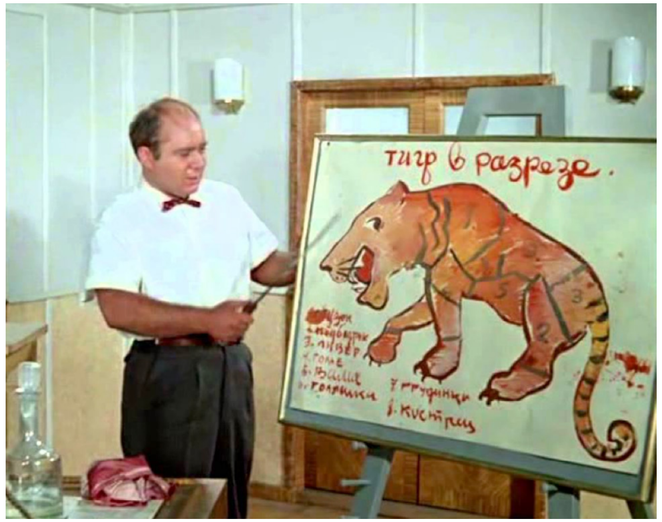
What is this Course About?



Frame from film “Striped cruise”
Directed by Vladimir Fetin

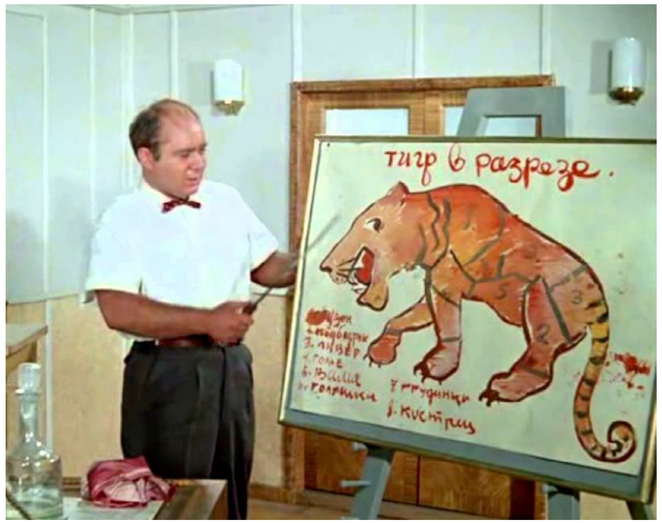
1. ~~Quantum Mechanics~~
2. ~~Software Engineering~~
3. Mathematical Model of Quantum Computations
4. Quantum Algorithms

Learning Objectives



Frame from film “Striped cruise”
Directed by Vladimir Fetin

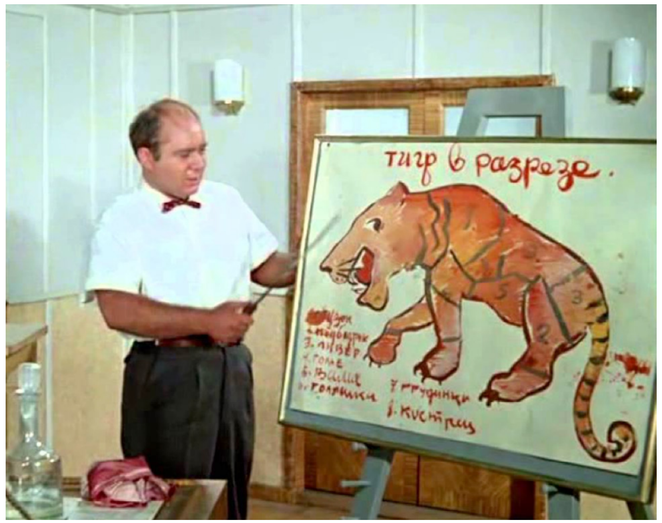
Learning Objectives



Frame from film “Striped cruise”
Directed by Vladimir Fetin

1. Understanding QC

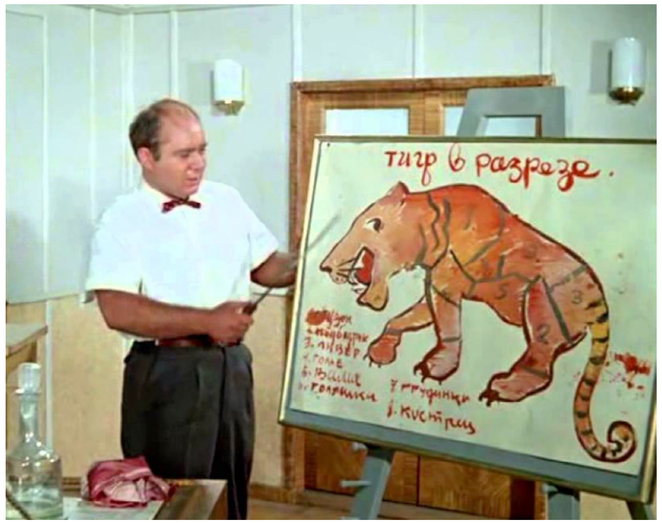
Learning Objectives



Frame from film “Striped cruise”
Directed by Vladimir Fetin

1. Understanding QC
2. Quantum algorithms design skills

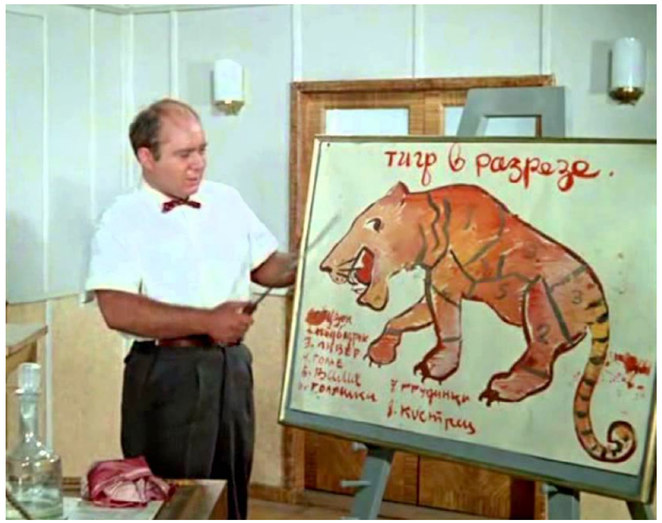
Learning Objectives



Frame from film “Striped cruise”
Directed by Vladimir Fetin

1. Understanding QC
2. Quantum algorithms design skills
3. Understanding the QC application limits

Prerequisites



Frame from film “Striped cruise”
Directed by Vladimir Fetin

1. Linear algebra
2. Hilbert spaces
3. Classical computing

Examination and Self-Control

Frame from film “Déjà vu”
Directed by Leonid Gaidai

1. IVQ
2. Week tests

Extending your Knowledge

1. John Preskill's lecture notes on quantum computing
2. Umesh Vazirani's lectures on quantum computing
3. Popular science books of David Deutsch
4. etc.

Week Plan

- ~~Learning objectives~~
- Computation. Information
- Computational system characteristics
- The goal of computations. Universality. Algorithm
- Computational Complexity
- Quantum computing
- Quantum effects
- The Multiverse interpretation of quantum mechanics

St Petersburg
University

www.spbu.ru