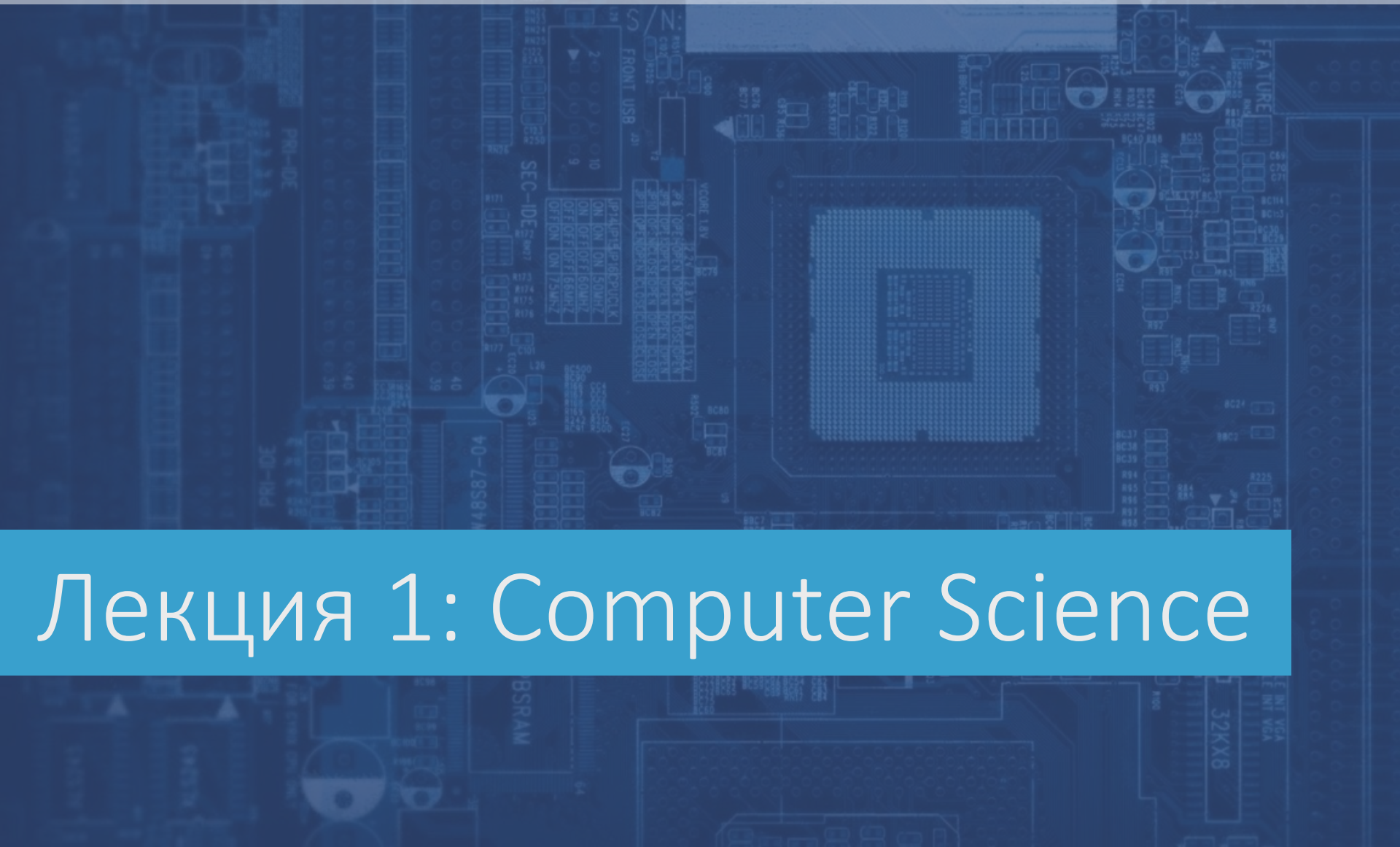
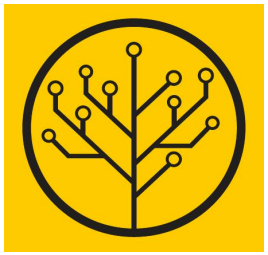
Научный семинар по
Компьютерным наукам



Лекция 1: Computer Science

Я хочу заниматься информатикой!

05.01.00 — инженерная и компьютерная графика.
05.01.00 — Инженерная геометрия и компьютерная графика.
05.02.00 — машиностроение и машиноведение, мехатроника, роботы, сварка[2]
05.03.00 — обработка материалов[3].
05.04.00 — энергетическое машиностроение, атомные реакторы, турбомашины[4].
05.05.00 — транспортное горное и строительное машиностроение[5].
05.07.00 — авиационная техника, летательные аппараты
05.08.00 — кораблестроение.
05.09.00 — электротехника, светотехника.
05.11.00 — приборостроение
05.12.00 — радиотехника, радиолокация, радионавигация.
05.13.00 — информатика, системный анализ.
05.14.00 — энергетика, электростанции.
05.15.00 — разработка и эксплуатация полезных ископаемых
05.16.00 — металлургия и материаловедение, нанотехнологии[6]
05.17.00 — химические технологии, полимеры и композиты
05.18.00 — пищевая промышленность, консервирование.
05.19.00 — лёгкая промышленность
05.20.00 — агроинженерные системы.
05.21.00 — деревообработка.
05.22.00 — транспорт, железные дороги, навигация, судовождение[7].
05.23.00 — строительство
05.24.00 — геодезия[8]
05.25.00 — документалистика
05.26.00 — безопасность труда
05.27.00 — электроника



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- Программная инженерия
- Прикладная математика и информатика
- Бизнес-информатика
- Информатика и вычислительная техника
- Информационные системы и технологии
- Автоматизация технологических процессов и производств
- Компьютерная безопасность
- Информационная безопасность телекоммуникационных систем
- Приборостроение
- Мехатроника и робототехника
- Управление в технических системах
- Управление в технических системах
- Системы автоматического управления
- Приборы и системы ориентации, стабилизации и навигации
- Информационные системы и телекоммуникации
- Проектирование и технология производства электронной аппаратуры
- Системы обработки информации
- Компьютерные системы и сети
- Программное обеспечение ЭВМ и информационные технологии
- Информационная безопасность
- Высокопроизводительные компьютерные системы
- Защита информации
- Биотехнические системы и технологии
- Инфокоммуникационные технологии и системы связи
- Конструирование и технология электронных средств
- Материаловедение и технологии материалов
- Прикладная информатика
- Техносферная безопасность
- Электроника и наноэлектроника
- Управление качеством
- Прикладная математика


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PROJECTS
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COMPUTING
INFORMATION
TECHNOLOGY
PROMOTION
MODELS
E-MARKETING
COMMUNICATION
MULTIMEDIA
NETWORK
CONTENT
PROCESSING
BRANDING
COMPUTER
CONSUMER
CONSUMER DEMAND
MARKETS
ORGANIZATION
PLANNING
SOFTWARE
CODING
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ANALYTICS
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MOBILE
PRO
PRICING
SOCIAL NETWORK
SEGMENTATION
STATISTICS
TARGET
INFORMATION
DIGITAL
CODING
SOCIAL NETWORKS

Структура курса

- Обзорное изучение Python 3.5
- Лекции по различным разделам информатики
- Практика на Python

- Проектная работа (для желающих)
- Исследовательская работа (2 лекции за год)

- ДЗ – это **важно**!

Поехали!

Что такое computer science?

Что такое computer science? (это информатика :)

- **Computer science** (also called computing science) is the study of the theoretical foundations of information and computation and their implementation and application in computer systems.

- **Mathematical foundations**
  - **Coding theory** – Useful in networking and other areas where computers communicate with each other.
  - **Game theory** – Useful in artificial intelligence and cybernetics.
  - **Graph theory** – Foundations for data structures and searching algorithms.
  - **Mathematical logic** – Boolean logic and other ways of modeling logical queries; the uses and limitations of formal proof methods
  - **Number theory** – Theory of the integers. Used in cryptography as well as a test domain in artificial intelligence.

- **Algorithms and data structures**
  - **Algorithms** – Sequential and parallel computational procedures for solving a wide range of problems.
  - **Data structures** – The organization and manipulation of data.

- **Artificial intelligence**
  - **Artificial intelligence** – The implementation and study of systems that exhibit an autonomous intelligence or behavior of their own.
  - **Automated reasoning** – Solving engines, such as used in Prolog, which produce steps to a result given a query on a fact and rule database, and automated theorem provers that aim to provemathematical theorems with some assistance from a programmer.
  - **Computer vision** – Algorithms for identifying three-dimensional objects from a two-dimensional picture.
  - **Soft computing**, the use of inexact solutions for otherwise extremely difficult problems:
    - **Machine learning** - Automated creation of a set of rules and axioms based on input.
    - **Evolutionary computing** - Biologically inspired algorithms.
  - **Natural language processing** - Building systems and algorithms that analyze, understand, and generate natural (human) languages.
  - **Robotics** – Algorithms for controlling the behavior of robots.

- **Communication and security**
  - **Networking** – Algorithms and protocols for reliably communicating data across different shared or dedicated media, often including error correction.
  - **Computer security** – Practical aspects of securing computer systems and computer networks.
  - **Cryptography** – Applies results from complexity, probability, algebra and number theory to invent and break codes, and analyze the security of cryptographic protocols.

- **Computer architecture**
  - **Computer architecture –** The design, organization, optimization and verification of a computer system, mostly about CPUs and Memory subsystem (and the bus connecting them).
  - **Operating systems –** Systems for managing computer programs and providing the basis of a usable system.

- **Computer graphics**
  - **Computer graphics –** Algorithms both for generating visual images synthetically, and for integrating or altering visual and spatial information sampled from the real world.
  - **Image processing –** Determining information from an image through computation.

- **Concurrent, parallel, and distributed systems**
  - **Parallel computing -** The theory and practice of simultaneous computation; data safety in any multitasking or multithreaded environment.
  - **Concurrency (computer science) –** Computing using multiple concurrent threads of execution, devising algorithms for solving problems on multiple processors to achieve maximal speed-up compared to sequential execution.
  - **Distributed computing –** Computing using multiple computing devices over a network to accomplish a common objective or task and thereby reducing the latency involved in single processor contributions for any task.

- **Databases**
  - **Relational databases –** the set theoretic and algorithmic foundation of databases.
  - **Structured Storage -** non-relational databases such as NoSQL databases.
  - **Data mining –** Study of algorithms for searching and processing information in documents and databases; closely related to information retrieval.

- **Programming languages and compilers**
  - **Compiler theory –** Theory of compiler design, based on Automata theory.
  - **Programming language pragmatics –** Taxonomy of programming languages, their strength and weaknesses. Various programming paradigms, such as object-oriented programming.
  - **Programming language theory**
  - **Formal semantics –** rigorous mathematical study of the meaning of programs.
  - **Type theory –** Formal analysis of the types of data, and the use of these types to understand properties of programs — especially program safety.

- **Scientific computing**
  - **Computational science** – constructing mathematical models and quantitative analysis techniques and using computers to analyze and solve scientific problems.
  - **Numerical analysis** – Approximate numerical solution of mathematical problems such as root-finding, integration, the solution of ordinary differential equations; the approximation of special functions.
  - **Symbolic computation** – Manipulation and solution of expressions in symbolic form, also known as Computer algebra.
  - **Computational physics** – Numerical simulations of large non-analytic systems
  - **Computational chemistry** – Computational modelling of theoretical chemistry in order to determine chemical structures and properties
  - **Bioinformatics and Computational biology** – The use of computer science to maintain, analyse, store biological data and to assist in solving biological problems such as Protein folding, function prediction and Phylogeny.
  - **Computational neuroscience** – Computational modelling of neurophysiology.

- **Software engineering**
  - **Formal methods** – Mathematical approaches for describing and reasoning about software designs.
  - **Software engineering** – The principles and practice of designing, developing, and testing programs, as well as proper engineering practices.
  - **Algorithm design** – Using ideas from algorithm theory to creatively design solutions to real tasks.
  - **Computer programming** – The practice of using a programming language to implement algorithms.
  - **Human–computer interaction** – The study and design of computer interfaces that people use.
  - **Reverse engineering** – The application of the scientific method to the understanding of arbitrary existing software.

- **Web development**
  - **Web programming**
  - **Web designing**

- **Theory of computation**
  - **Automata theory** – Different logical structures for solving problems.
  - **Computability theory** – What is calculable with the current models of computers. Proofs developed by Alan Turing and others provide insight into the possibilities of what may be computed and what may not.
  - List of unsolved problems in computer science
  - **Computational complexity theory** – Fundamental bounds (especially time and storage space) on classes of computations.
  - **Quantum computing theory** – Explores computational models involving quantum superposition of bits.


python
TM

Материалы

- https://docs.python.org/3.5/tutorial/
- https://habrahabr.ru/post/150302/
- https://pythonworld.ru/samouchitel-python
- http://pythontutor.ru/

Среда разработки

- IDLE
- JetBrains PyCharm