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- Semidefinite programming

- Convex optimization

- Quasiconvex programming and unimodality

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- Quadratic programming

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- Submodular optimization and polymatroids

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- Bio-inspired optimization

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- Sorting and searching

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- Caching and paging algorithms

- K-server algorithms

- Adversary models

- Parameterized complexity and exact algorithms

- Fixed parameter tractability

- W hierarchy

- Streaming, sublinear and near linear time algorithms

- Bloom filters and hashing

- Sketching and sampling

- Lower bounds and information complexity
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- Sequential Monte Carlo methods

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 - Submodular optimization and polymatroids
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 - Non-parametric optimization
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 - Differential variational inequalities
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 - Differential calculus
 - Integral calculus
- Functional analysis
 - Approximation
- Integral equations
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- Lambda calculus

- Differential calculus

- Integral calculus

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- Algebraic topology

- Geometric topology

Continuous functions

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- Entity relationship models

- Graph-based database models

 - Hierarchical data models

 - Network data models

- Physical data models

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- Data streams

- Data provenance

- Incomplete data

- Temporal data

- Uncertainty

- Inconsistent data

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- Multidimensional range search

- Data scans

- Point lookups

- Unidimensional range search

- Proximity search

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- Data encryption

- Record and block layout

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- Database query processing

 - Query optimization

 - Query operators

 - Query planning

 - Join algorithms

- Database transaction processing

 - Data locking

 - Transaction logging

 - Database recovery

- Record and buffer management

- Parallel and distributed DBMSs

 - Key-value stores

 - MapReduce-based systems

 - Relational parallel and distributed DBMSs

- Triggers and rules

- Database views

- Integrity checking

- Distributed database transactions

 - Distributed data locking

 - Deadlocks

 - Distributed database recovery

- Main memory engines

- Online analytical processing engines

- Stream management

- Query languages

 - Relational database query languages

 - Structured Query Language

 - XML query languages

 - XPath

 - XQuery

 - Query languages for non-relational engines

 - MapReduce languages

- Call level interfaces

- Database administration

 - Database utilities and tools

 - Database performance evaluation

 - Autonomous database administration

 - Data dictionaries

- Information integration

 - Deduplication

 - Extraction, transformation and loading

- Data exchange
- Data cleaning
- Wrappers (data mining)
- Mediators and data integration
- Entity resolution
- Data warehouses
- Federated databases

Middleware for databases

- Database web servers
- Application servers
- Object-relational mapping facilities
- Data federation tools
- Data replication tools
- Distributed transaction monitors
- Message queues
- Service buses
- Enterprise application integration tools
- Middleware business process managers

Information storage systems

Information storage technologies

- Magnetic disks
- Magnetic tapes
- Optical / magneto-optical disks
- Storage class memory
 - Flash memory
 - Phase change memory
- Disk arrays
- Tape libraries

Record storage systems

Record storage alternatives

- Heap (data structure)
- Hashed file organization
- Indexed file organization
- Linked lists

Directory structures

- B-trees
- Vnodes
- Inodes
- Extent-based file structures

Block / page strategies

- Slotted pages

- Intrapage space management
- Interpage free-space management
- Record layout alternatives
 - Fixed length attributes
 - Variable length attributes
 - Null values in records
- Relational storage
 - Horizontal partitioning
 - Vertical partitioning
 - Column based storage
 - Hybrid storage layouts
 - Compression strategies
- Storage replication
 - Mirroring
 - RAID
 - Point-in-time copies
 - Remote replication
 - Storage recovery strategies
- Storage architectures
 - Cloud based storage
 - Storage network architectures
 - Storage area networks
 - Direct attached storage
 - Network attached storage
 - Distributed storage
- Storage management
 - Hierarchical storage management
 - Storage virtualization
 - Information lifecycle management
 - Version management
 - Storage power management
 - Thin provisioning
- Information systems applications
 - Enterprise information systems
 - Intranets
 - Extranets
 - Enterprise resource planning
 - Enterprise applications
 - Data centers
- Collaborative and social computing systems and tools

- Blogs
- Wikis
- Reputation systems
- Open source software
- Social networking sites
- Social tagging systems
- Synchronous editors
- Asynchronous editors
- Spatial-temporal systems
 - Location based services
 - Geographic information systems
 - Sensor networks
 - Data streaming
 - Global positioning systems
- Decision support systems
 - Data warehouses
 - Expert systems
 - Data analytics
 - Online analytical processing
- Mobile information processing systems
- Process control systems
- Multimedia information systems
 - Multimedia databases
 - Multimedia streaming
 - Multimedia content creation
 - Massively multiplayer online games
- Data mining
 - Data cleaning
 - Collaborative filtering
 - Association rules
 - Clustering
 - Nearest-neighbor search
 - Data stream mining
- Digital libraries and archives
- Computational advertising
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 - Web searching and information discovery
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 - Web crawling
 - Web indexing

- Page and site ranking
- Spam detection
- Content ranking
- Collaborative filtering
- Social recommendation
- Personalization
- Social tagging
- Online advertising
 - Sponsored search advertising
 - Content match advertising
 - Display advertising
 - Social advertising
- Web mining
 - Site wrapping
 - Data extraction and integration
 - Deep web
 - Surfacing
 - Search results deduplication
- Web log analysis
- Traffic analysis
- Web applications
 - Internet communications tools
 - Email
 - Blogs
 - Texting
 - Chat
 - Web conferencing
- Social networks
- Crowdsourcing
 - Answer ranking
 - Trust
 - Incentive schemes
 - Reputation systems
- Electronic commerce
 - Digital cash
 - E-commerce infrastructure
 - Electronic data interchange
 - Electronic funds transfer
 - Online shopping
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Online auctions

Web interfaces

Wikis

Browsers

Mashups

Web services

Simple Object Access Protocol (SOAP)

RESTful web services

Web Services Description Language (WSDL)

Universal Description Discovery and Integration (UDDI)

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Web data description languages

Semantic web description languages

Resource Description Framework (RDF)

Web Ontology Language (OWL)

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Data encoding and canonicalization

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Collaborative search

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- Learning to rank
- Combination, fusion and federated search
- Information retrieval diversity
- Top-k retrieval in databases
- Novelty in information retrieval
- Retrieval tasks and goals
 - Question answering
 - Document filtering
 - Recommender systems
 - Information extraction
 - Sentiment analysis
 - Expert search
 - Near-duplicate and plagiarism detection
 - Clustering and classification
 - Summarization
 - Business intelligence
- Evaluation of retrieval results
 - Test collections
 - Relevance assessment
 - Retrieval effectiveness
 - Retrieval efficiency
 - Presentation of retrieval results
- Search engine architectures and scalability
 - Search engine indexing
 - Search index compression
 - Distributed retrieval
 - Peer-to-peer retrieval
 - Retrieval on mobile devices
 - Adversarial retrieval
 - Link and co-citation analysis
 - Searching with auxiliary databases
- Specialized information retrieval
 - Structure and multilingual text search
 - Structured text search
 - Mathematics retrieval
 - Chemical and biochemical retrieval
 - Multilingual and cross-lingual retrieval

Multimedia and multimodal retrieval

Image search

Video search

Speech / audio search

Music retrieval

Environment-specific retrieval

Enterprise search

Desktop search

Web and social media search

Security And Privacy

Cryptography

Key management

Public key (asymmetric) techniques

Digital signatures

Public key encryption

Symmetric cryptography and hash functions

Block and stream ciphers

Hash functions and message authentication codes

Cryptanalysis and other attacks

Information-theoretic techniques

Mathematical foundations of cryptography

Formal methods and theory of security

Trust frameworks

Security requirements

Formal security models

Logic and verification

Security services

Authentication

Biometrics

Graphical / visual passwords

Multi-factor authentication

Access control

Pseudonymity, anonymity and untraceability

Privacy-preserving protocols

Digital rights management

Authorization

Intrusion/anomaly detection and malware mitigation

Malware and its mitigation

Intrusion detection systems

Artificial immune systems

- Social engineering attacks

- Spoofing attacks

- Phishing

- Security in hardware

- Tamper-proof and tamper-resistant designs

- Embedded systems security

- Hardware security implementation

- Hardware-based security protocols

- Hardware attacks and countermeasures

- Malicious design modifications

- Side-channel analysis and countermeasures

- Hardware reverse engineering

- Systems security

- Operating systems security

- Mobile platform security

- Trusted computing

- Virtualization and security

- Browser security

- Distributed systems security

- Information flow control

- Denial-of-service attacks

- Firewalls

- Vulnerability management

- Penetration testing

- Vulnerability scanners

- File system security

- Network security

- Security protocols

- Web protocol security

- Mobile and wireless security

- Denial-of-service attacks

- Firewalls

- Database and storage security

- Data anonymization and sanitization

- Management and querying of encrypted data

- Information accountability and usage control

- Database activity monitoring

- Software and application security

- Software security engineering

- Web application security

- Social network security and privacy

Domain-specific security and privacy architectures

Software reverse engineering

Human and societal aspects of security and privacy

Economics of security and privacy

Social aspects of security and privacy

Privacy protections

Usability in security and privacy

Human-Centered Computing

Human computer interaction (HCI)

HCI design and evaluation methods

User models

User studies

Usability testing

Heuristic evaluations

Walkthrough evaluations

Laboratory experiments

Field studies

Interaction paradigms

Hypertext / hypermedia

Mixed / augmented reality

Command line interfaces

Graphical user interfaces

Virtual reality

Web-based interaction

Natural language interfaces

Collaborative interaction

Interaction devices

Graphics input devices

Displays and imagers

Sound-based input / output

Keyboards

Pointing devices

Touch screens

Haptic devices

HCI theory, concepts and models

Interaction techniques

Auditory feedback

Text input

Pointing

Gestural input

Interactive systems and tools

- User interface management systems

- User interface programming

- User interface toolkits

- Empirical studies in HCI

- Interaction design

 - Interaction design process and methods

 - User interface design

 - User centered design

 - Activity centered design

 - Scenario-based design

 - Participatory design

 - Contextual design

 - Interface design prototyping

 - Interaction design theory, concepts and paradigms

 - Empirical studies in interaction design

 - Systems and tools for interaction design

 - Wireframes

- Collaborative and social computing

 - Collaborative and social computing theory, concepts and paradigms

 - Social content sharing

 - Collaborative content creation

 - Collaborative filtering

 - Social recommendation

 - Social networks

 - Social tagging

 - Computer supported cooperative work

 - Social engineering (social sciences)

 - Social navigation

 - Social media

 - Collaborative and social computing design and evaluation methods

 - Social network analysis

 - Ethnographic studies

 - Collaborative and social computing systems and tools

 - Blogs

 - Wikis

 - Reputation systems

 - Open source software

 - Social networking sites

 - Social tagging systems

 - Synchronous editors

 - Asynchronous editors

Empirical studies in collaborative and social computing

Collaborative and social computing devices

Ubiquitous and mobile computing

Ubiquitous and mobile computing theory, concepts and paradigms

Ubiquitous computing

Mobile computing

Ambient intelligence

Ubiquitous and mobile computing systems and tools

Ubiquitous and mobile devices

Smartphones

Interactive whiteboards

Mobile phones

Mobile devices

Portable media players

Personal digital assistants

Handheld game consoles

E-book readers

Tablet computers

Ubiquitous and mobile computing design and evaluation methods

Empirical studies in ubiquitous and mobile computing

Visualization

Visualization techniques

Treemaps

Hyperbolic trees

Heat maps

Graph drawings

Dendrograms

Cladograms

Visualization application domains

Scientific visualization

Visual analytics

Geographic visualization

Information visualization

Visualization systems and tools

Visualization toolkits

Visualization theory, concepts and paradigms

Empirical studies in visualization

Visualization design and evaluation methods

Accessibility

Accessibility theory, concepts and paradigms

- Empirical studies in accessibility
- Accessibility design and evaluation methods
- Accessibility technologies
- Accessibility systems and tools

Computing Methodologies

- Symbolic and algebraic manipulation
 - Symbolic and algebraic algorithms
 - Combinatorial algorithms
 - Algebraic algorithms
 - Nonalgebraic algorithms
 - Symbolic calculus algorithms
 - Exact arithmetic algorithms
 - Hybrid symbolic-numeric methods
 - Discrete calculus algorithms
 - Number theory algorithms
 - Equation and inequality solving algorithms
 - Linear algebra algorithms
 - Theorem proving algorithms
 - Boolean algebra algorithms
 - Optimization algorithms
- Computer algebra systems
 - Special-purpose algebraic systems
- Representation of mathematical objects
 - Representation of exact numbers
 - Representation of mathematical functions
 - Representation of Boolean functions
 - Representation of polynomials
- Parallel computing methodologies
 - Parallel algorithms
 - MapReduce algorithms
 - Self-organization
 - Shared memory algorithms
 - Vector / streaming algorithms
 - Massively parallel algorithms
 - Parallel programming languages
- Artificial intelligence
 - Natural language processing
 - Information extraction
 - Machine translation
 - Discourse, dialogue and pragmatics
 - Natural language generation

- Speech recognition
- Lexical semantics
- Phonology / morphology
- Language resources
- Knowledge representation and reasoning
 - Description logics
 - Semantic networks
 - Nonmonotonic, default reasoning and belief revision
 - Probabilistic reasoning
 - Vagueness and fuzzy logic
 - Causal reasoning and diagnostics
 - Temporal reasoning
 - Cognitive robotics
 - Ontology engineering
 - Logic programming and answer set programming
 - Spatial and physical reasoning
 - Reasoning about belief and knowledge
- Planning and scheduling
 - Planning for deterministic actions
 - Planning under uncertainty
 - Multi-agent planning
 - Planning with abstraction and generalization
 - Robotic planning
 - Evolutionary robotics
- Search methodologies
 - Heuristic function construction
 - Discrete space search
 - Continuous space search
 - Randomized search
 - Game tree search
 - Abstraction and micro-operators
 - Search with partial observations
- Control methods
 - Robotic planning
 - Evolutionary robotics
 - Computational control theory
 - Motion path planning
- Philosophical/theoretical foundations of artificial intelligence
 - Cognitive science
 - Theory of mind

Distributed artificial intelligence

Multi-agent systems

Intelligent agents

Mobile agents

Cooperation and coordination

Computer vision

Computer vision tasks

Biometrics

Scene understanding

Activity recognition and understanding

Video summarization

Visual content-based indexing and retrieval

Visual inspection

Vision for robotics

Scene anomaly detection

Image and video acquisition

Camera calibration

Epipolar geometry

Computational photography

Hyperspectral imaging

Motion capture

3D imaging

Active vision

Computer vision representations

Image representations

Shape representations

Appearance and texture representations

Hierarchical representations

Computer vision problems

Interest point and salient region detections

Image segmentation

Video segmentation

Shape inference

Object detection

Object recognition

Object identification

Tracking

Reconstruction

Matching

Machine learning

Learning paradigms

Supervised learning

Ranking

Learning to rank

Supervised learning by classification

Supervised learning by regression

Structured outputs

Cost-sensitive learning

Unsupervised learning

Cluster analysis

Anomaly detection

Mixture modeling

Topic modeling

Source separation

Motif discovery

Dimensionality reduction and manifold learning

Reinforcement learning

Sequential decision making

Inverse reinforcement learning

Apprenticeship learning

Multi-agent reinforcement learning

Adversarial learning

Multi-task learning

Transfer learning

Lifelong machine learning

Learning under covariate shift

Learning settings

Batch learning

Online learning settings

Learning from demonstrations

Learning from critiques

Learning from implicit feedback

Active learning settings

Semi-supervised learning settings

Machine learning approaches

Classification and regression trees

Kernel methods

Support vector machines

Gaussian processes

Neural networks

Logical and relational learning

Inductive logic learning

Statistical relational learning

Learning in probabilistic graphical models

Maximum likelihood modeling

Maximum entropy modeling

Maximum a posteriori modeling

Mixture models

Latent variable models

Bayesian network models

Learning linear models

Perceptron algorithm

Factorization methods

Non-negative matrix factorization

Factor analysis

Principal component analysis

Canonical correlation analysis

Latent Dirichlet allocation

Rule learning

Instance-based learning

Markov decision processes

Partially-observable Markov decision processes

Stochastic games

Learning latent representations

Deep belief networks

Bio-inspired approaches

Artificial life

Evolvable hardware

Genetic algorithms

Genetic programming

Evolutionary robotics

Generative and developmental approaches

Machine learning algorithms

Dynamic programming for Markov decision processes

Value iteration

Q-learning

Policy iteration

Temporal difference learning

Approximate dynamic programming methods

Ensemble methods

Boosting

Bagging

- Spectral methods
- Feature selection
- Regularization
- Cross-validation
- Modeling and simulation
 - Model development and analysis
 - Modeling methodologies
 - Model verification and validation
 - Uncertainty quantification
 - Simulation theory
 - Systems theory
 - Network science
 - Simulation types and techniques
 - Uncertainty quantification
 - Quantum mechanic simulation
 - Molecular simulation
 - Rare-event simulation
 - Discrete-event simulation
 - Agent / discrete models
 - Distributed simulation
 - Continuous simulation
 - Continuous models
 - Real-time simulation
 - Interactive simulation
 - Multiscale systems
 - Massively parallel and high-performance simulations
 - Data assimilation
 - Scientific visualization
 - Visual analytics
 - Simulation by animation
 - Artificial life
 - Simulation support systems
 - Simulation environments
 - Simulation languages
 - Simulation tools
 - Simulation evaluation
- Computer graphics
 - Animation
 - Motion capture
 - Procedural animation
 - Physical simulation

- Motion processing

- Collision detection

- Rendering

- Rasterization

- Ray tracing

- Non-photorealistic rendering

- Reflectance modeling

- Visibility

- Image manipulation

- Computational photography

- Image processing

- Texturing

- Image-based rendering

- Antialiasing

- Graphics systems and interfaces

- Graphics processors

- Graphics input devices

- Mixed / augmented reality

- Perception

- Graphics file formats

- Virtual reality

- Image compression

- Shape modeling

- Mesh models

- Mesh geometry models

- Parametric curve and surface models

- Point-based models

- Volumetric models

- Shape analysis

- Distributed computing methodologies

- Distributed algorithms

- MapReduce algorithms

- Self-organization

- Distributed programming languages

- Concurrent computing methodologies

- Concurrent programming languages

- Concurrent algorithms

Applied Computing

- Electronic commerce

- Digital cash

- E-commerce infrastructure
- Electronic data interchange
- Electronic funds transfer
- Online shopping
- Online banking
- Secure online transactions
- Online auctions
- Enterprise computing
 - Enterprise information systems
 - Intranets
 - Extranets
 - Enterprise resource planning
 - Enterprise applications
 - Data centers
- Business process management
 - Business process modeling
 - Business process management systems
 - Business process monitoring
 - Cross-organizational business processes
 - Business intelligence
- Enterprise architectures
 - Enterprise architecture management
 - Enterprise architecture frameworks
 - Enterprise architecture modeling
- Service-oriented architectures
- Event-driven architectures
- Business rules
- Enterprise modeling
- Enterprise ontologies, taxonomies and vocabularies
- Enterprise data management
- Reference models
- Business-IT alignment
- IT architectures
- IT governance
- Enterprise computing infrastructures
- Enterprise interoperability
 - Enterprise application integration
 - Information integration and interoperability
- Physical sciences and engineering
 - Aerospace
 - Avionics

- Archaeology
- Astronomy
- Chemistry
- Earth and atmospheric sciences
 - Environmental sciences
- Engineering
 - Computer-aided design
- Physics
- Mathematics and statistics
- Electronics
 - Avionics
- Telecommunications
 - Internet telephony
- Life and medical sciences
 - Computational biology
 - Molecular sequence analysis
 - Recognition of genes and regulatory elements
 - Molecular evolution
 - Computational transcriptomics
 - Biological networks
 - Sequencing and genotyping technologies
 - Imaging
 - Computational proteomics
 - Molecular structural biology
 - Computational genomics
 - Genomics
 - Computational genomics
 - Systems biology
 - Consumer health
 - Health care information systems
 - Health informatics
 - Bioinformatics
 - Metabolomics / metabonomics
 - Genetics
 - Population genetics
 - Proteomics
 - Computational proteomics
 - Transcriptomics
- Law, social and behavioral sciences
 - Anthropology
 - Ethnography

- Law
- Psychology
- Economics
- Sociology
- Computer forensics
 - Surveillance mechanisms
 - Investigation techniques
 - Evidence collection, storage and analysis
 - Network forensics
 - System forensics
 - Data recovery
- Arts and humanities
 - Fine arts
 - Performing arts
 - Architecture (buildings)
 - Computer-aided design
 - Language translation
 - Media arts
 - Sound and music computing
- Computers in other domains
 - Digital libraries and archives
 - Publishing
 - Military
 - Cyberwarfare
 - Cartography
 - Agriculture
 - Computing in government
 - Voting / election technologies
 - E-government
 - Personal computers and PC applications
 - Word processors
 - Spreadsheets
 - Computer games
 - Microcomputers
- Operations research
 - Consumer products
 - Industry and manufacturing
 - Supply chain management
 - Command and control
 - Computer-aided manufacturing

- Decision analysis
 - Multi-criterion optimization and decision-making

- Transportation

- Forecasting

- Marketing

- Education

 - Digital libraries and archives

 - Computer-assisted instruction

 - Interactive learning environments

 - Collaborative learning

 - Learning management systems

 - Distance learning

 - E-learning

 - Computer-managed instruction

- Document management and text processing

 - Document searching

 - Document management

 - Text editing

 - Version control

 - Document metadata

 - Document capture

 - Document analysis

 - Document scanning

 - Graphics recognition and interpretation

 - Optical character recognition

 - Online handwriting recognition

 - Document preparation

 - Markup languages

 - Extensible Markup Language (XML)

 - Hypertext languages

 - Annotation

 - Format and notation

 - Multi / mixed media creation

 - Image composition

 - Hypertext / hypermedia creation

 - Document scripting languages

Social And Professional Topics

- Professional topics

 - Computing industry

 - Industry statistics

 - Computer manufacturing

Sustainability

Management of computing and information systems

Project and people management

- Project management techniques

- Project staffing

- Systems planning

- Systems analysis and design

- Systems development

- Computer and information systems training

Implementation management

- Hardware selection

- Computing equipment management

- Pricing and resource allocation

Software management

- Software maintenance

- Software selection and adaptation

System management

- Centralization / decentralization

- Technology audits

- Quality assurance

Network operations

File systems management

Information system economics

History of computing

- Historical people

- History of hardware

- History of software

- History of programming languages

- History of computing theory

Computing education

- Computational thinking

- Accreditation

- Model curricula

Computing education programs

- Information systems education

- Computer science education

 - CS1

- Computer engineering education

- Information technology education

- Information science education

- Computational science and engineering education

Software engineering education

Informal education

Computing literacy

Student assessment

K-12 education

Adult education

Computing and business

Employment issues

Automation

Computer supported cooperative work

Economic impact

Offshoring

Reengineering

Socio-technical systems

Computing profession

Codes of ethics

Employment issues

Funding

Computing occupations

Computing organizations

Testing, certification and licensing

Assistive technologies

Computing / technology policy

Intellectual property

Digital rights management

Copyrights

Software reverse engineering

Patents

Trademarks

Internet governance / domain names

Licensing

Treaties

Database protection laws

Secondary liability

Soft intellectual property

Hardware reverse engineering

Privacy policies

Censorship

Pornography

Hate speech

- Political speech
- Technology and censorship
- Censoring filters
- Surveillance
 - Governmental surveillance
 - Corporate surveillance
- Commerce policy
 - Taxation
 - Transborder data flow
 - Antitrust and competition
 - Governmental regulations
 - Online auctions policy
 - Consumer products policy
- Network access control
 - Censoring filters
 - Broadband access
 - Net neutrality
 - Network access restrictions
 - Age-based restrictions
 - Acceptable use policy restrictions
 - Universal access
- Computer crime
 - Social engineering attacks
 - Spoofing attacks
 - Phishing
 - Identity theft
 - Financial crime
 - Malware / spyware crime
- Government technology policy
 - Governmental regulations
 - Import / export controls
- Medical information policy
 - Medical records
 - Personal health records
 - Genetic information
 - Patient privacy
 - Health information exchanges
 - Medical technologies
 - Remote medicine

User characteristics

Race and ethnicity

Religious orientation

Gender

Men

Women

Sexual orientation

People with disabilities

Geographic characteristics

Cultural characteristics

Age

Children

Seniors

Adolescents