

ANKARA ÜNİVERSİTESİ
Bilgisayar Mühendisliği Doktora Yeterlilik Sınavı
YAZILI SINAV BÖLÜMÜ

Sınavın Yazılı Bölümü 10 temel alanı kapsar:

- Veri Yapıları
- Algoritmalar
- Ayrık Yapılar
- Hesaplama Teorisi
- İşletim Sistemleri
- Sayısal Tasarım ve Bilgisayar Mimarisi
- Bilgisayar Ağları
- Programlama Dilleri
- Veritabanı Yönetimi
- Yazılım Mühendisliği

Sınavda, her alandan bir soru sorulur. Öğrenci bu alanlardan seçtiği 5 tanesi için hazırlanmış soruları yanıtlar. Her alan sorusu eşit ağırlıkta değerlendirilir.

Her konu başlığı öğrencinin alandaki temel bilgi birikimini ölçmeyi hedefler. Bu bağlamda, sınavda sorgulanacak konu başlıkları ve referans kaynaklar aşağıda verilmiştir.

Veri Yapıları

Refs:

- * Data Structures using C and C++ (2nd ed.), Langsam, Augenstein, Tenenbaum, Prentice Hall, 1995.
- * Mark Allen Weiss, Data Structures and Algorithm Analysis in C++ (3rd ed.), Addison Wesley, 2006.

- Lists, stacks, queues
- Trees (binary trees, binary search trees, AVL trees, , red-black trees)
- Priority Queues (heaps)
- Hashing

Algorithms

Refs:

- * Introduction to Algorithms, T. H. Cormen, C. E. Lieserson, R. L. Rivest, C. Stein, Mc Graw-Gill.
- * Anany Levitin, Introduction to the Design and Analysis of Algorithms, Pearson.

- Analysis of Algorithms
- Sorting and Searching
- Greedy Algorithms
- Graph algorithms
- Divide and Conquer Algorithms

Ayrık Yapılar

Refs:

- * B.Kolman, R.C.Busby, S. Ross, Discrete Mathematical Structures, Ptentice Hall,1996, 3rd edition.
- * Ralph P. Grimaldi, Discrete and Combinatorial Mathematics, 5/e, Pearson Eucation, 2006.

- Fundamental Principles of Counting
- Fundamentals of Logic
- Set Theory
- Mathematical Induction
- Relations and Functions
- Alphabets, Strings, Languages, Finite State Machines
- The Principle of Inclusion and Exclusion
- Recurrence Relations
- Introduction to graph Theory.

Hesaplama Theorisi

Refs:

- * Introduction to the Theory of Computation, M.Sipser, Course Technology, 2005.
- * J.E.Hopcroft, R.Motwani, J.D. Ullman, Automata theory, Languages, and Computation, Pearson, 2007, 3rd edition.

- Finite Automata and Regular Expressions: Alphabets and languages, Finite representations of languages,
- Deterministic finite automata, Nondeterministic finite automata, Equivalence of DFA and NFA,
- Pumping lemma and its applications, State minimization
- Push-down Automata and Context Free Grammars
- Turing Machines and unrestricted grammars
- Church-Turing thesis, universal Turing machines
- Halting problem

İşletim Sistemleri

Refs:

- * Modern Operating Systems, A.S. Tanenbaum, Prentice-Hall, ISBN 0-13-595752-4, 3rd edition, 2009.
- * Operating System Concepts, A. Silberschatz, P.B. Galvin, (8th ed.), Addison-Wesley, ISBN 0-201-50480-4, 2009.

- Processes & Interprocess Communication

- Threads
- Process Scheduling
- Process Synchronisation
- Memory Management
- File Systems
- Input/Output
- Deadlocks
- Naming, security, and reliability

Sayısal Tasarım ve Bilgisayar Mimarisi

Refs:

- * Digital Design, M. Mano, Prentice-Hall, ISBN 0-13-212994-9, 1991.
- * Computer Organization and Architecture, William Stallings, 9th Edition, Prentice Hall, 2012

- Processor: Datapath and Control
- Pipelining (pipelined control, hazards, branch prediction)
- Memory Hierarchy (interleaving, cache memory, virtual memory)
- Number systems and conversion, boolean algebra
- Minterm and maxterm expansions, Karnaugh maps and Quine McCluskey minimization
- Combinatorial logic circuit design, NAND and NOR gate based design
- State machines and sequential circuits, flip-flops, minimization of state tables, state assignment
- Higher level digital system design using SSI-MSI blocks such as multiplexers/decoders, adders, memory and programmable gate arrays
- Asynchronous sequential circuits, flow tables, timing hazards

Bilgisayar Ağları

Refs:

- * William Stallings, Data and Computer Communications, 7th-10th Edition, Prentice Hall Publ., 2014
- * Andrew S. Tanenbaum, "Computer Networks", 4th/5th Edition, Prentice Hall Publ., 2011 The principles and techniques employed in computer and wireless networks;

- Computer Networks (Network Hardware, Network Software, Reference Models, TCP/IP, OSI)
- Physical Layer (Transmission Media, PSTN, Signal Encoding Techniques)
- Data Link Layer (Services, Error Detection, and Correction, Framing, Flow Control, Data Link Protocols, LLC, MAC)
- Network Layer (Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internetworking, IP)
- Transport Layer (Primitives, Socket Programming, TCP, UDP)
- Application Layer (DNS, Electronic Mail, WWW, Multimedia)

Programlama Dilleri

Refs:

* Concepts of Programming Languages by Robert W. Sebesta

- Evaluation of Major Programming Languages
- Syntax and Semantic Analysis
- Data Types and Control Structures
- Subprograms and Implementation of Subprograms
- Functional Programming
- Object Oriented Programming Languages
- Script Languages

Veritabanı Yönetimi

Refs:

* Fundamentals of Database Systems, 6th Edition, Ramez Elmasri, Shamkant B. Navathe

- The Relational Data Model and Relational Database Constraints
- SQL
- Relational Algebra
- Data Modeling Using the Entity-Relationship (ER) Model
- Enhanced Entity-Relationship (EER) Model
- Relational Database Design by ER- and EER-to-Relational Mapping
- Functional Dependencies and Normalization for Relational Databases
- Transaction Processing Concepts, Concurrency Control Techniques, Database Recovery Techniques

Yazılım Mühendisliği

Refs:

* Software Engineering: a Practitioners Approach, R.S. Pressman, (7th ed.), McGraw-Hill, 2009.

* Software Engineering, Sommerville, (9th ed.), Addison-Wesley, 2010.

- Lifecycles and process models
- Software project management
- Specification and modeling techniques
- Traditional, object oriented and component based approaches
- OO software engineering with UML
- Software metrics
- Testing and integration methods
- Maintenance