

مفردات مواد الامتحان التنافسي / برنامج الماجستير في علوم الحاسوب

Artificial Intelligence الذكاء الاصطناعي . 1

- Intelligent agents: reactive, deliberative, goal-driven, utility-driven
- Intelligent agents: learning agents, Artificial Intelligence programming techniques
- Problem-solving through Search: forward and backward, state-space
- Problem-solving through Search: blind, heuristic, problem-reduction, A, A*, AO*, minimax, constraint propagation
- Problem-solving through Search: neural, stochastic, and evolutionary search algorithms, sample applications.
- Predicate logic, situation calculus, description logics
- Reasoning with defaults, reasoning about knowledge, sample applications.
- Planning: planning as search, partial order planning ,
- Planning: construction and use of planning graphs
- Representing and Reasoning with Uncertain Knowledge: probability, connection to logic, independence, Bayes rule, bayesian networks, probabilistic inference, and sample applications .
- Decision-Making: basics of utility theory, decision theory, sequential decision problems, elementary game theory, sample applications .
- Decision-Making: sequential decision problems, elementary game theory, sample applications .
- Decision under uncertainty, MDP, POMDP,HMD

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2. Computer Networking شبكات الحاسوب

- Communications between devices and components of the communication system and protocols.
- Definition of networks, types of connectivity, protocols and standards.
- OSI and Internet models.
- The layers of network models.
- Digital and analog transmissions and specifiers.
- Study the tasks and work of the data link layer.
- Error detection and correction, framing, transmission and error control.
- Study the functions and work of the network layer.
- Addressing, networking, routing concepts.
- Routing, routing table components, routing algorithms.
- Study the tasks and work of the transport layer.
- Transport layer protocols, congestion control, and quality of service.
- Study the types of cables and compare them and their uses.

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3. Operating System نظم تشغيل

- Purpose and types of operating systems
- Processes, threads, and scheduling
- Implementing process scheduling algorithms
- Process synchronization and inter-process communication
- Memory Organization and allocation techniques
- Virtual memory concepts and demand paging
- File system structure and Operations
- I/O devices, drivers, and operations
- Deadlock concept and necessary conditions
- User authentication, access control, and security threats
- Concepts, challenges, and Synchronization in distributed systems

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4. امنية معلومات Information Security

- How to establish trust in computing systems
- Symmetric and asymmetric cryptosystems
- Stream ciphers and block ciphers
- Hash functions, MACs, and digital signatures
- Advanced topics: Blockchains
- Intrusion detections techniques•
- Hardware and software malware detection
- Basic principles of establishing trust in hardware
- Attestation, TPM, and secure boot
- Attacks (buffer-overflow, ROP, jump-oriented)
- Hardware-Support for memory security
- Program analysis tools and methodologies
- Security in ML (attacks and defences)
- Privacy in ML (attacks)
- Privacy-Preserving Computation
- How to establish trust in computing systems
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5. Image Processing معالجة صور رقمية

- Computer Imaging system
- Digital Image file Format
- Digital Image Representation
- Region Of Interest Image Geometry
- Color Image Types
- Basic Relationships between Pixels
- Image Zooming
- Arithmetic operation on Image
- Logic operation on Image
- Image Enhancement
- Image Edge Detection
- Image Segmentation

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6. Data Structures هياكل بيانات

- Matrices and their types
- The concept of constraint
- stack concept
- The concept of arithmetic expressions
- stack applications
- Queue concept
- The concept of linked list and its types
- The circular and double linked list
- tree concept
- Binary search tree
- Search concept and search algorithms

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7. Programming C++ برمجة سي بلس بلس

- C++ languages basics.
- Converting algorithms to programs.
- Keywords and Identifier.
- Data types.
- Variables and their Declarations.
- Variable initialization.
- Variable scope.
- Arithmetic operation.
- Operation order.
- Comparison and logic operations.
- Unary operators
- Increment and decrement operators.
- Characters and Literal in C++.
- Objects, variables and constants.
- Selection Statement (IF statement)
- Examples on If statements.
- If – else Statement
- Examples on if – else statement.
- Switch case statement.
- Examples on switch - case statement.
- While statement
- Do –while Statement
- For Statement
- Jumping statements (break and continue)