Topics for oral exam

1.MICROCHIPS. Describe briefly how microchips are made.What properties make silicon such an ideal material for microchip manufacturing? Discuss technologies and materials that might be applied for microchip design/ computing in the future.

2. COMPUTER ARCHITECTURE. Discuss computer architecture - describe its components and their functions. CPU - structure, components and functions. How computers calculate - explain.

3. MEMORY. Discuss types of computer memory - structure, application, advantages & disadvantages. What type of memory is the most efficient nowadays? What might be the future of computer memory and how extensive could it be?

4. OS. How is the OS built? Describe its structure, components and their functions in detail. Discuss types of operating systems and their applications.(e.g. embedded, template etc.).

5. INTERFACES. Discuss types of interfaces and their application. Describe components of GUI. Discuss breakthroughs that influenced the interface design in the past. What might the future interfaces be like?

6. NETWORKS. Describe network components and their applications in detail. Name 2 wireless technologies - how do they work? how do they differ?

7. NETWORKS. Discuss network types depending on the covered area, function they serve (VPN, SAN) or functions assigned to particular devices on the network(p-2-p vs client/server). What is a network topology? Discuss 4 main ones (bus, star, ring, mesh) - their structures, how data is transmitted, talk about their pros and cons. Broadband vs baseband systems.

8. NETWORKS. Discuss network protocols, types of routing (circuit, message, packet switching), transmission modes (half-, full-duplex).What problems might occur during transmission and what solutions are implemented in modern networks to deal with them? (e.g. collision, exponential back-off, MAC, congestion control eltc)

9. NETWORKS. Discuss OSI model - layers, functions, transmission modes.

—----------

10. DATA SECURITY. What's a virus? What parts does it consist of? What computer crimes do you know? How can you protect yourself against them or limit their effects? What's public-key cryptography about and how does it work?

11. SOFTWARE ENGINEERING. What 5 stages of programming would you enumerate? What does each of them focus on? What's OOP? Discuss its key concepts and advantages.

12. PROGRAMMING LANGUAGES. What classifications of programming languages do you know? Which 5 programming languages would you consider the best ones and why? What are IDEs? What should a good code look like?

13. ARTIFICIAL INTELLIGENCE. What is artificial intelligence? What applications does it have? What will be the future of AI? What do you know about machine learning and its types? Can you provide examples of real life applications of machine learning?