**Computer Science Fields:**

**Current Advancement in Recent**

**Computer Science Field.**

1. **Artificial Intelligence (AI):**

🡪 AI continues to advance rapidly in various domains. Deep learning techniques, such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs), have achieved remarkable results in areas like computer vision, natural language processing, and speech recognition. AI is also being applied to autonomous vehicles, robotics, healthcare, finance, and many other fields.

1. **Algorithms and Data Structures:**

🡪 Researchers are continually developing new algorithms and optimizing existing ones to improve efficiency and solve complex computational problems. Advances in data structures, such as advanced tree structures, graph algorithms, and indexing techniques, enable faster data retrieval and manipulation.

1. **Computer Architecture:**

🡪 Advancements in computer architecture focus on increasing performance, energy efficiency, and parallelism. This includes developments in multi-core processors, accelerators (e.g., GPUs), specialized architectures for AI (e.g., tensor processing units), and heterogeneous computing systems.

1. **Computer Networks:**

🡪 With the rise of the Internet of Things (IoT) and the increasing demand for high-speed connectivity, advancements in computer networks focus on technologies like 5G, edge computing, software-defined networking (SDN), and network function virtualization (NFV). Additionally, the deployment and security of large-scale distributed systems, including cloud computing and blockchain networks, are active areas of research.

1. **Computer Security and Cryptography:**

🡪 As cybersecurity threats become more sophisticated, advancements are being made in areas such as intrusion detection systems, anomaly detection, secure multiparty computation, and homomorphic encryption. Post-quantum cryptography, which aims to develop algorithms resistant to attacks by quantum computers, is also an active area of research.

1. **Database Systems:**

🡪 Advances in database systems include the development of distributed databases for scalability and fault tolerance, in-memory databases for high-performance data processing, and NoSQL databases for handling unstructured and big data. Additionally, data management techniques for privacy preservation and secure data sharing are gaining attention.

1. **Human-Computer Interaction (HCI):**

🡪 HCI research focuses on creating intuitive user interfaces and experiences, including touch interfaces, augmented reality (AR), virtual reality (VR), and natural language processing. User-centered design, accessibility, and usability testing are also important aspects of HCI.

1. **Operating Systems:**

🡪 Recent developments in operating systems include containerization technologies like Docker and Kubernetes for efficient software deployment and management. Additionally, advancements in real-time operating systems, resource allocation, and scheduling algorithms contribute to the performance and reliability of modern computing systems.

1. **Software Engineering:**

🡪 Agile software development methodologies, DevOps practices, and continuous integration/continuous deployment (CI/CD) pipelines have gained widespread adoption. Software engineering is also increasingly incorporating AI techniques, such as automated testing and software maintenance, as well as applying ethics and fairness considerations to the development process.

1. **Computer Graphics and Visualization:**

🡪 Advances in computer graphics focus on real-time rendering techniques, physically-based rendering, virtual reality (VR), and augmented reality (AR). Visualization techniques are being used to analyze and present complex data sets, including interactive visualizations and immersive environments.

1. **Distributed Systems:**

🡪Distributed systems advancements include scalable and fault-tolerant architectures, consensus algorithms (e.g., blockchain), distributed storage systems (e.g., Hadoop, distributed file systems), and distributed computing frameworks (e.g., Apache Spark).

1. **Robotics:**

🡪 Recent developments in robotics include advancements in machine learning for robot control, sensor technologies (e.g., lidar, depth cameras), collaborative and social robots, and the integration of AI techniques for perception, planning, and manipulation tasks.

**BE Fundamentals and Required Subjects:**

1. 3rd semester
   1. Data structure and its application learn using ( C# ).
   2. Software engineering.
   3. Computer organization
   4. Discrete mathematical structure.
   5. Transform calculus, Fourier Series and Numerical Technique.
2. 4th semester
3. Design and analysis of algorithm
4. Operating system
5. Data communication
6. Microcontroller and embedded system.
7. Complex analysis, probability and statistical methods.
8. 5th semester
9. Computer Network and Security
10. Database Management System
11. Python
12. Unix programming
13. Automata theory and computability
14. 6th semester
15. Web technology(react roadmap)
16. 7th semester
17. AI &ML(project)
18. Big data analytics(no sql project)
19. Cryptography
20. Electrical Energy conservation.
21. 8th semester
22. No sql database(project)
23. System architecture and design.(extra)
24. Internet of things.

Problem Solving and logic buildings

1. javascript, css ——> solve challenging problems.
2. React Js ——> Do more challenging projects.
3. C# ——-> learn DSA and do problem solving questions.
4. Sql ——>solve difficult questions.

Make best short  note for reference

1. 12 mathematics
2. IELTS
3. GRE
4. All BE subjects that you have listed.