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Dr Prabha Mandayam, Associate Professor, IIT Madras earned her PhD in Quantum Computing, Caltech. Bio - Prabha Mandayam graduated with a Masters in Physics from IIT Madras and obtained her PhD from the Institute for Quantum Computing at Caltech. After working as a post-doctoral fellow at the Institute for Mathematical Sciences and INSPIRE faculty fellow at the Chennai Mathematical Institute, she rejoined her alma mater as faculty in 2014. Her research interests include quantum error correction and quantum cryptography. IBM Research, Dr Anupama Ray, Advisory Research Scientist, IBM Quantum Ambassador and Qiskit Advocate, IBM Research earned her PhD in Deep Learning, IIT Delhi. Bio- Anupama Ray is an Advisory Research Scientist at IBM Research, India. She is an IBM Quantum Ambassador and a Qiskit Advocate. She completed her Ph.D from Indian Institute of Technology Delhi. With her doctoral research focusing on developing and applying multi-dimensional deep recurrent neural networks for document analysis and computer vision applications. At IBM Research she has been predominantly working in the area of natural language processing, building NLP systems for low-resource languages, domain independent information extraction systems and natural language generation. She has interests in Quantum ML, Quantum NLP, and AI for societal applications. She has published several papers in top tier conferences and journals and has received several Best paper awards. She has been the recipient of the IEEE Best Woman Professional (Early Career) and several awards at IBM Research such as Research Division Award, Eminence and Excellence Award and Outstanding Technical Achievement Award to name a few. She was nominated and selected as a Young Scientist in Global Young Scientist Summit and is an active member of IEEE, AAAI, and Society of Women Engineers (SWE) India. 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Comparison with discrete classic states. Linear Algebra. Linear Algebra review: vector spaces, linear operators, DIRAC notation, the tensor product. The postulates of mechanics. Postulates of quantum mechanics, incl. evolution and measurement. Important concepts in quantum mechanics. Entanglement, distinguishing orthogonal and non-orthogonal quantum states, no-cloning and no signalling. The quantum circuit model. The circuit model of quantum teleportation. Quantum gates and circuits. Universality of the quantum circuit model, and efficient simulation of arbitrary two-qubit gates with a standard universal set of gates. Some applications of quantum information. Applications of quantum information (other than quantum computation): quantum key distribution, superdense coding and quantum teleportation. Deutsch-Jozsa algorithm. Introducing Deutsches algorithm leading onto its generalisation, the Deutsch-Jozsa algorithm. Quantum search. Grover's search algorithm: analysis and lower bounds. Quantum Fourier Transform and Quantum Phase Estimation. Definition of the Quantum Fourier Transform (QFT), and efficient representation thereof as a quantum circuit. Application of the QFT to enable Quantum Phase Estimation (QPE). Application 1 of QFT / QPE: Factoring. Shore's algorithm: reduction of factoring to period finding and then using the QFT for period finding. Application 2 of QFT / QPE: Quantum Chemistry. Efficient simulation of quantum systems, and applications to real-world problems in quantum chemistry. Quantum complexity. Quantum complexity classes and their relationship to classical complexity. Comparison with probabilistic computation. Quantum error correction. Introducing the concept of quantum error correction required for the following lecture on fault-tolerance. Fault tolerant quantum computing. Elements of fault tolerant computing; the threshold theorem for efficient suppression of errors. Adiabatic quantum computing. The quantum adiabatic theorem, and adiabatic optimisation. Quantum annealing and D-Wave. Case studies in near-term quantum computation. .jdalyram FO Ytisrevinu(sdilhc wedna /9222hp/lick/elpoep/de.hceti.ac.yrocht./pth .)hcetlac(lilisserp njoj /21p .PTTh .)Yelekreb ut inarizav hsemu :some erutel rehto 20401.8081/sba/gro.vixra//:spth yrtsimehc lanaitapmoc mutnauq .La eldracm fdp.17440.17440. 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