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Quantum Computing Quest: The Search for Commercial Quantum Computers

Short Answer Key

1. Quantum annealing machines are specialized quantum computers designed for optimization tasks. D-Wave Systems offers commercially available quantum annealers. These machines are tailored to find optimal solutions for specific optimization problems, such as route planning and materials research.
2. Cloud-based access to quantum computers allows users to access and experiment with quantum computing resources through the internet. Users can submit quantum computing tasks to remote quantum processors via a web interface. The advantages include accessibility to quantum hardware without the need for physical access, collaboration among researchers worldwide, and the ability to experiment with quantum algorithms without owning quantum hardware.
3. Quantum volume in quantum computing refers to the combined measure of the number of qubits in a quantum computer and the error rates associated with those qubits. It provides an indication of the quantum computer's capabilities, with higher quantum volume indicating a more powerful and reliable quantum computer. It's important because it defines the potential of a quantum computer to handle complex tasks.
4. One limitation of many commercially available quantum computers is that they are tailored for specific types of problems, often optimization or quantum annealing tasks. These machines may not be well-suited for general-purpose quantum computing tasks, limiting their versatility.
5. When planning to use commercially available quantum computers, organizations and researchers should consider factors such as the specific problem they intend to solve, the quantum volume of the available hardware, the cost of accessing quantum resources, the skill set required for quantum programming, and the latency and security considerations associated with cloud-based access.

