Sydnee Boothby 11896367

1. **Introducing How Computers Work (1:21)**
   * What are the key components of a computer system, and how do they interact to perform tasks?

The key components of a computer system include electrical circuits, hardware (such as CPU, GPU, and memory drives; which store and analyze input) and software. The hardware components execute software commands written in code.

1. **Computer Science Basics: Binary (2:23)**
   * Why is binary used in computer systems, and how does it represent data?

Computers use a numbers system of 1’s and 0’s to represent all data (1 = on/true, 0=off/false). Each segment of data is made up of bits (1’s or 0’s); combinations of bits create the files that we access with computers. Binary is simpler and more efficient than the decimal system that we use outside of digital systems.

1. **How Computers Work: Binary & Data (5:59)**
   * How does binary enable computers to represent and process different types of data?

The wires and circuits that carry computer information can either detect an electrical signal (1), or an absence of a signal (0s). More bits can represent more complex information. Binary numbers can be converted to decimal by multiplying by 2 to the power of the number placement. Letters (ASCII codes), images (pixel RGB values), videos, and audios (Sonic waves) can also be stored as binary numbers.

1. **Computer Science Basics: Programming Languages (2:21)**
   * What role do programming languages play in enabling communication with computers?

Programming languages have libraries of commands to execute a user’s desired outcome, converting language that can be understood by the coder into language that can be understood by the computer. Each language has its own strengths and is applied depending on the desired programming goal.

1. **Computer Science Basics: Algorithms (2:30)**
   * What is an algorithm, and how can it be applied to solve everyday problems?

An algorithm is a detailed set of steps to solve a specific task. When solving everyday problems, to achieve a desired result, you can follow the step-by-step directions that worked in the past. Software algorithms operate similarly, only written in code.

1. **What is the Internet? (3:45)**
   * How do computers connect and communicate over the internet?

The internet is composed of independently operated networks, it is a distributed communication system that stores data into blocks that can be quickly sent to other connected computers.

1. **What is Big Data? (1:49)**
   * What is Big Data, and how is it used to solve real-world problems?

Big Data is a collection of data that is so large and complex that it requires novel data management tools; it is generated by users all across the internet.

1. **How AI Works (1:30)**
   * What is artificial intelligence (AI), and what makes it different from traditional computer programs?

Artificial intelligence can be used to personalize user experience with software, from education to social media and art. AI can address societies novel problems by quickly recognizing patterns.

1. **AI: What is Machine Learning? (2:56)**
   * How does machine learning enable computers to learn and improve without being explicitly programmed?

Machine learning allows computers to make decisions that affect the user’s experience. AI is the modern form of machine learning, allowing computers to make decisions and recognize patterns without explicitly being encoded to do so. AI does this by reading large quantities of data (from text, to images, audio, and video), making connections and learning similar to the way humans to.

1. **How Chatbots and Large Language Models Work (7:21)**
   * How do large language models enable chatbots to understand and respond to human language?

Large language models are a new form of AI technology, they are trained on large quantities of data from across the internet. Using this stored information, AI can generate new text, using probability calculations, statistical, and mathematical concepts. Neural networks are inspired by the human nervous system, it is the way AI is trained to generate and predict text based on surrounding context from across the internet.

1. **What is Cybersecurity? (1:49)**
   * What is the purpose of cybersecurity, and why is it critical in today’s digital world?

Cybersecurity helps protect devices and networks, ensuring that malicious parties cannot access personal data. Using firewalls, encryption, IDS, and secure passwords, data can be kept safe. The CIA is a governmental agency that prevents data attacks, such as phishing or malware.

1. **How Blockchain Works: Why Blockchain? (6:06)**

How does blockchain technology ensure security and transparency in data management?

The blockchain is a decentralized method of storing information, allowing online transactions, especially those involving cryptocurrencies, to be tracked, recorded, and authenticated. Blockchains store records on independent computers that cannot be corrupted.