CHEATSHEET LESSON 1

Hardware:

1. CPU (Central Processing Unit):

- The brain of the computer; controls other elements.

2. Disk Drive:

- Reads and/or writes information on a disk.

3. Hard Drive:

- Reads and writes information, including OS, program files, and data files.

4. Keyboard:

- Input device for data entry by pressing keys.

5. Modem:

- Connects one computer to another over a phone line.

6. Monitor:

- Displays information visually.

7. Mouse:

- Points to items on a monitor.

8. NIC (Network Interface Card):

- Provides a physical connection to a network.

9. Printer:

- Converts computer output into a printed image.

Software:

1. Applications:

- Self-contained programs (e.g., spreadsheets, databases).

2. Bit:

- Computer's basic unit of information.

3. Boot:

- Loading or initializing an operating system.

4. Browser:

- Program for viewing World Wide Web pages.

5. Database:

- Large structured set of data.

6. File:

- Namable unit of data storage.

7. Folder:

- Graphical representation to organize files.

8. Gigabyte:

- 1,073,741,824 bytes; abbreviated GB.

9. GUI (Graphical User Interface):

- Uses pictures and words to represent ideas.

10. Icon:

- Small picture representing a file or program.

System Components:

1. System Unit:

- Main computer cabinet housing key components.

2. Keyboard:

- Input device for characters and commands.

3. Video Display:

- Visual output device displaying characters and graphics.

4. Printer:

- Hard copy output device applying data to paper.

5. Speakers:

- Audio output devices for voice, music, and messages.

Inside the System Unit:

1. Power Supply:

- Converts AC voltage to DC for computer circuitry.

2. Motherboard:

- Main component containing major structures.

3. Disk Drives:

- Mass storage devices holding data for extended periods.

4. Adapter Cards:

- Enhance basic system with additional functions.

5. Signal Cables:

- Connecting cables passing control signals and data.

Form Factors:

1. ATX (Advanced Technology Extended):

- Most widely used form factor for PCs.

2. BTX (Balanced Technology Extended):

- Scalable form factor for optimal cooling.

3. NLX (New Low-profile Extended):

- Replacement form factor supporting newer technologies.

Additional Terminology:

- Byte:

- Small unit of data storage; 8 bits; holds one character.

- Download:

- Transferring data from another computer to yours.

- FAQ (Frequently Asked Questions):

- Documents answering common questions.

- RAM (Random Access Memory):

- Storage that changes; erased when the computer is off.

- ROM (Read-Only Memory):

- Storage not changed even when the computer is off.

- URL (Uniform Resource Locator):

- Web address on the World Wide Web.

- Virus:

- Harmful computer program causing glitches or data destruction.

- Window:

- Screen in a software program allowing viewing multiple programs.

- Word Processor:

- Program for creating text documents.

CHEATSHEET LESSON 2

1. Anti-Static: Product preventing static electricity buildup.

2. BIOS: Basic Input/Output System, controls basic computer functions.

3. Graphic Tablet: Input device using pen or puck for drawing.

4. Hard-Disk Drive: Non-removable storage device.

5. Hardware: Tangible computer components.

6. Joy Stick: Hand-held control for cursor or video game symbol.

7. LAN Card: Local area network interface card.

8. Multi-tester: Measures voltage, current, and resistance.

9. NIC: Network Interface Card.

10. Network: Communication system connecting computers.

11. OHS: Occupational Health and Safety.

12. Operating System (OS): Software controlling program and data allocation.

13. Peers: Computers sharing the same protocol layer.

14. Printer: Hardware producing paper copy.

15. RAM: Random Access Memory, primary memory.

16. RJ 45: Registered Jack 45, connector for NIC ports.

17. Router: Device forwarding data packets in networks.

18. Scanner: Input device translating text or illustrations.

19. Server: Special computer for network tasks.

20. Software: Programs and data used by a computer.

21. Static: Discharge of electricity between objects.

22. USB: Universal Serial Bus, hardware interface.

Introduction:

- Emphasizes Occupational Health and Safety Policies for computer lab work.

- Stresses personal safety guidelines when working with computers.

OHS Procedures (When Assembling Computer Hardware):

1. Wear non-conductive rubber-soled shoes.

2. Unplug electronics from the power source.

3. Avoid removing components when the computer is on.

4. Remove jewelry.

5. Avoid mixing electronic components and water.

6. Do not over tighten screws.

7. Handle computer components by the edges.

8. Wear an anti-static device.

Electro-Static Discharge (ESD):

- Rapid transfer of electrostatic charge between objects.

- Can damage computer components.

- Anti-static wrist strap, bag, and mat prevent ESD.

Preventing ESD:

1. Ensure zero potential by touching a metal surface.

2. Stand while working on the computer.

3. Remove all cords from the back of the computer.

4. Avoid working during electrical storms.

5. Remove jewelry.

CHEATSHEET LESSON 3  
  
1. Input Devices:

- Definition: Devices that allow users to enter data or commands into the computer.

- Examples: Keyboard, mouse, microphone, scanner, digital camera, PC camera.

- Role: Transmit data or commands to the processing unit.

2. Output Devices:

- Definition: Devices that present processed data in an understandable and useful form.

- Examples: Printer, monitor, speakers, portable media player.

- Importance: Provide users with tangible results of computer processing.

3. Processing Devices:

- Definition: Computer electronic circuitry, including the central processing unit (CPU).

- CPU Role: Manipulates input data into the desired information.

- Memory: Temporarily holds data and program instructions during processing.

- Chip: Electronic device containing microscopic pathways for carrying electrical current.

4. Storage Devices:

- Definition: Secondary storage for storing data and programs outside the computer.

- Examples: Hard disk, USB flash drives, CDs, DVDs, memory cards.

- Function: Holds data, information, and programs permanently.

5. Communications Devices:

- Definition: Devices facilitating connections between the computer and communication networks.

- Transmission Media: Cables, telephone lines, satellites, cellular radio.

- Example: Modem - widely used for data exchange.

- Purpose: Enable communication and data exchange between computers.

6. Communication Process:

- Input/Output Devices: Facilitate communication with computers.

- Input Devices: Translate user data and communications into a computer-understandable form.

- Processing: CPU manipulates data, controls the computer system.

- Memory: Primary storage temporarily holds data during processing.

- Secondary Storage: Feeds data to the CPU, stores data for future use.

- Output Devices: Translate processed data back into a human-understandable form.

Key Takeaways:

- Communication with computers involves input/output devices.

- Input devices translate user data for the computer; output devices translate processed data for users.

- The central processing unit (CPU) manipulates and controls the computer system.

- Memory (primary storage) temporarily holds data during processing, while secondary storage stores data for future use.

CHEATSHEET LESSON 4

1. Installation Precautions and Procedures:

- Plan and prepare thoroughly for computer hardware and software installation.

- Be cautious of sharp pins, rough chassis edges, and hot components to avoid personal injury and wiring damage.

- Adhere to warnings and limitations for authorized technical personnel access.

2. Basic Precautions and Procedures:

- Read documentation and procedures before installation.

- Set jumpers properly to prevent CPU damage.

- Ensure effective cooling to prevent CPU and motherboard damage.

- Install memory in pairs with the same size and type.

- Unplug power supply before adding or removing components.

- Test the computer against system requirements before booting up.

- Be aware of irregular Power On Self-Test (POST) beep codes indicating issues.

Effects of Computers:

1. Violation of Privacy:

- Personal and confidential records stored in computers can lead to privacy violations and identity theft.

- Emphasizes the importance of proper protection for sensitive data.

2. Impact on Labor Force:

- Computers have increased productivity but replaced skills, impacting workers.

- Stresses the need for ongoing education and highlights outsourcing trends affecting domestic employment.

3. Health Risks:

- Prolonged or improper computer use can lead to injuries and disorders.

- Recommends proper workplace design, posture, and breaks to mitigate health risks.

- Addresses computer addiction as a treatable disorder.

4. Public Safety:

- Warns about potential dangers of sharing personal information online.

- Advises caution to prevent falling victim to crimes committed by strangers.

5. Impact on Environment:

- Computer manufacturing and waste processes deplete natural resources and pollute the environment.

- Encourages strategies like recycling, regulating manufacturing, extending computer life, and donating replaced computers.

- Introduces WEEE (Waste Electrical and Electronic Equipment Regulation) as a directive for responsible electronic waste handling in the European Union.

CHEATSHEET LESSON 5

- Operating System (OS): A set of programs managing computer hardware resources and providing common services for application software.

Key Characteristics:

- System Software: Integral part of the system software in a computer.

- Application Dependency: Necessary for application programs to function.

- Versatility: Found on various devices, ranging from cellular phones and video game consoles to supercomputers and web servers.

Functions:

- Resource Management: Manages computer hardware resources efficiently.

- Service Provision: Provides essential services for application software.

Types:

- Single Program OS: Operating system and application programs are separate.

- Monolithic OS: Operating system and application programs can be combined in simple systems.

Ubiquity:

- Widespread Presence: Present on almost any device containing a computer.

Examples:

- Cellular Phones

- Video Game Consoles

- Supercomputers

- Web Servers

Additional Information:

- Critical Component: Vital for the overall functioning of a computer system.

- Evolution: Operating systems have evolved over time, adapting to the changing needs of computing technology.

- User Interface: Some operating systems provide graphical user interfaces (GUI), while others use command-line interfaces (CLI).

- Security: Modern operating systems include security features to protect against unauthorized access and malware.

CHEATSHEET LESSON 6

Internal Memory vs. External Memory:

- Internal Memory (Primary Memory):

- Rapidly accessible while the computer is operational.

- Two types: ROM (Read-Only Memory) and RAM (Random-Access Memory).

- External Memory (Secondary Memory):

- Stores data persistently.

- Examples include hard drives, SSDs, USB drives, and CDs.

Types of Internal Memory:

- ROM (Read-Only Memory):

- Non-volatile, retains data without power.

- Used for booting up the computer.

- RAM (Random-Access Memory):

- Temporary storage for data during CPU tasks.

- Volatile, requires power to retain data.

Types of RAM:

- Dynamic RAM (DRAM):

- Main computer memory.

- Requires periodic refreshing due to capacitor discharge.

- Static RAM (SRAM):

- Faster but more expensive.

- Retains data as long as power is supplied.

Common Types of DRAM:

- Synchronous DRAM (SDRAM):

- Synchronizes memory speed with CPU clock.

- Allows more instructions at a given time.

- Rambus DRAM (RDRAM):

- Popular in the early 2000s.

- Used for video game devices and graphics cards.

- DDR SDRAM (Double Data Rate Synchronous DRAM):

- Doubles bandwidth by "double pumping."

- Successive generations: DDR1, DDR2, DDR3, DDR4.

Types of DRAM Packages:

- Single In-Line Memory Module (SIMM):

- Widely used from late 1980s to 1990s (now obsolete).

- 32-bit data bus, available in 30- and 72-pin configurations.

- Dual In-Line Memory Module (DIMM):

- Current memory modules.

- 168-pin connectors (older versions), 288-pin connectors for DDR4.

- Supports 64-bit data bus, providing increased data throughout.

CHEATSHEET LESSON 7

BIOS Chip Brands:

1. AWARD BIOS:

- A type of BIOS chip.

- Has its own set of error codes.

2. Phoenix BIOS:

- Another type of BIOS chip.

- Features its unique error code system.

3. AMI BIOS:

- A distinct BIOS chip brand.

- Comes with its own error code structure.

Error Codes:

- Each BIOS chip brand (AWARD, Phoenix, AMI) has its specific set of error codes.

- Error codes are used to indicate issues during the computer's startup process.

- Understanding these codes can help diagnose and troubleshoot hardware or software problems.

Relevance:

- BIOS (Basic Input/Output System) is a crucial firmware in computers, responsible for initializing hardware components during the boot process.

- Error codes provided by BIOS chips are essential for diagnosing and fixing hardware or software issues.

- Knowing the differences between AWARD, Phoenix, and AMI BIOS is useful in troubleshooting and system maintenance.

- Keeping BIOS up-to-date is advisable for compatibility and security reasons.  
  
  
CHEATSHEET LESSON 8

File/Network Servers

Role: Integral part of local area networks (LAN).

Components:

High-performance computers.

Large RAM and storage capacity.

One or more fast network interface cards (NICs).

Functions:

Provide access control.

Facilitate file sharing.

Enable printer sharing.

Manage email services.

Support databases and other network services.

Operating System:

Network operating system.

Includes tools for sharing server resources.

Permissions:

Features a sophisticated permissions-handling system.

Customizes access to sensitive information based on user needs.

Network Size:

For small networks, a single server handles multiple services.  
  
  
CHEATSHEET LESSON 9

Network Cable

- Definition:

- Physical medium used to connect network devices and facilitate data transmission.

- Types:

- Ethernet Cable:

- Commonly used for wired Ethernet networks.

- Cat5e, Cat6, Cat6a, Cat7 are different standards.

- Fiber Optic Cable:

- Uses light signals for high-speed data transfer.

- Suitable for long-distance and high-bandwidth applications.

- Coaxial Cable:

- Older technology; less common for modern data networks.

- Still used for cable television and certain broadband connections.

- Connectors:

- RJ45 connectors for Ethernet cables.

- Various connectors for fiber optic cables.

- Usage:

- Connects computers, routers, switches, and other network devices.

- Transmission Speed:

- Varies based on cable type and standards.

- Gigabit Ethernet, 10 Gigabit Ethernet, etc.

- Advantages:

- Wired connections offer reliability and stable performance.

- Fiber optic cables provide high bandwidth and resistance to electromagnetic interference.

- Considerations:

- Cable length affects signal quality.

- Proper installation and maintenance are crucial for optimal performance.  
  
  
CHEATSHEET LESSON 10

Defragmentation: Process of reorganizing data on a hard drive to bring related pieces together in a continuous manner, enhancing computer performance.

Tools:

- Popular Tool: Diskeeper is a widely used "disk defragmenter" that quickly restores and maintains Windows systems at optimal performance.

How it Works:

- When a file is saved, it is placed in an empty space on the disk.

- Changes to the file are saved in different empty spaces, causing fragmentation.

- Defragmentation gathers file pieces into one place, ensuring programs and unused space are organized.

Analogy:

- Like sorting items in a storage room; similar boxes are combined, creating more space.

Effects of Fragmentation:

- Weakest link in computer performance is the disk.

- Disk is significantly slower than RAM and CPU.

- Fragmentation affects access and write speed, degrading computer performance.

Performance & Reliability Gains:

- Better application performance.

- Reduced timeouts, crashes, and latency.

- Shorter backups.

- Faster data transfer rates and read/write times.

- Increased throughput and system stability.

- Extended hardware lifecycle.

- Faster boot-up, anti-virus scans, and internet browsing.

- Increased VM density.

- Reduced PC slows, lags, crashes, and unnecessary I/O activity.

- Reduced file corruption and data loss.

- Lower power consumption and energy costs.

- Lower cloud compute costs.

Summary:

Defragmentation is the process of organizing data on a hard drive to improve computer performance. Diskeeper is a popular tool for this task. Fragmentation occurs when files are saved in scattered spaces, slowing down access. Defragmentation organizes files, optimizing various aspects of computer performance and reliability. Its benefits range from faster application performance to reduced energy costs. Regular defragmentation is crucial for maintaining an efficient and stable computing environment.