



Technology in Action

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Ninth Edition

Technology in Action

Chapter 2

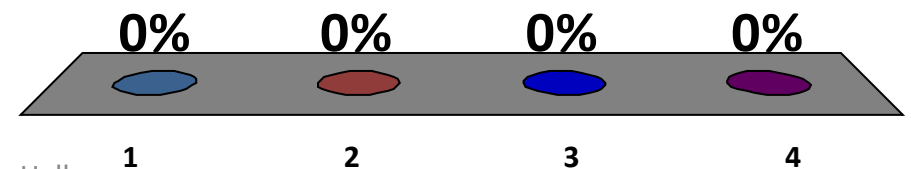
Looking at Computers: Understanding the Parts

Chapter Topics

- Understanding your computer
- Input and output devices
- Processing and memory on the motherboard
- Storing data and information
- Connecting peripherals to the computer
- Power controls
- Setting it all up

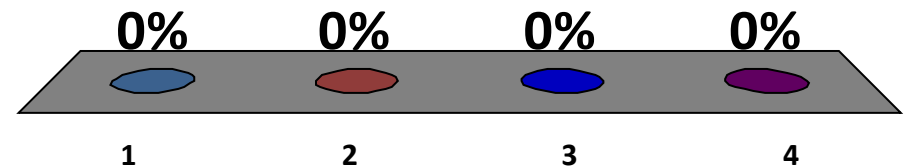
Which of the following is *NOT* one of the four major functions of a computer?

1. Process
2. Retrieve
3. Storage
4. Input



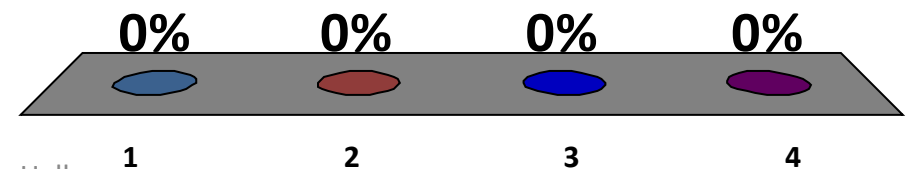
is a representation of a fact,
figure or idea.

1. Input
2. Output
3. Data
4. Information



Which of the following takes the place of a mouse on a notebook computer?

1. Touch pad
2. Trackpoint
3. Neither 1 nor 2
4. Both 1 and 2

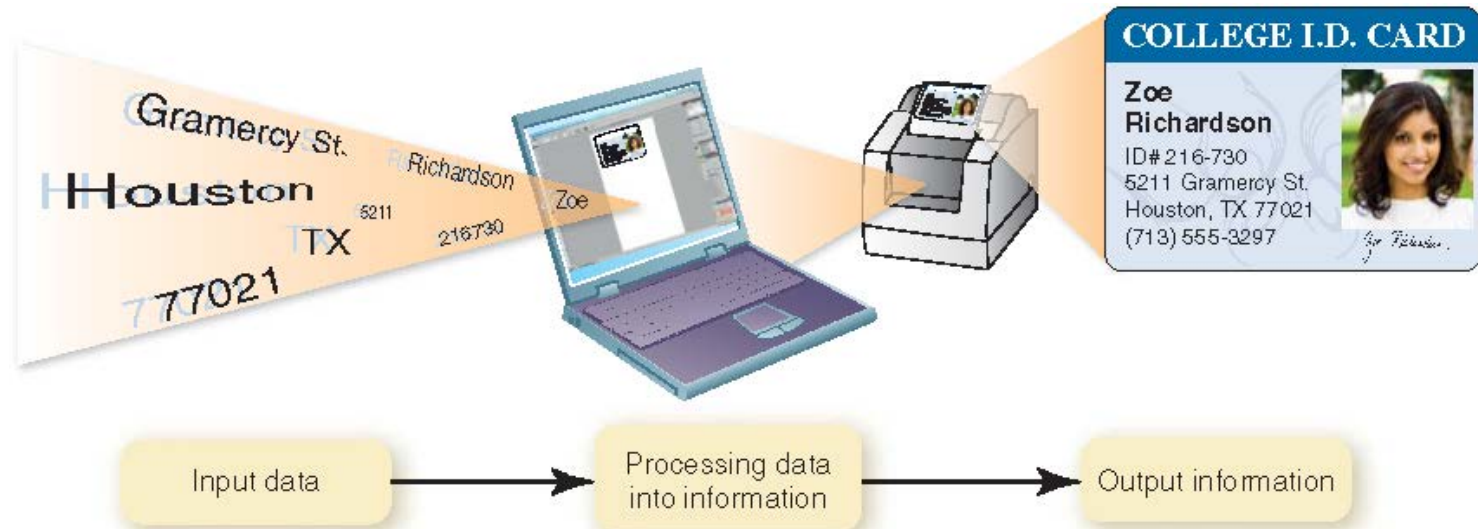


Understanding Your Computer

- Computer is a data processing device
- Performs four major functions:
 - *Input*: Gathers data, allows users to input data
 - *Process*: Manipulates, calculates, or organizes data into information
 - *Output*: Displays data and information for user
 - *Storage*: Saves data and information for later use

Data vs. Information

- *Data*: Representation of a fact, figure, or idea
- *Information*: Data that has been organized or presented in a meaningful fashion

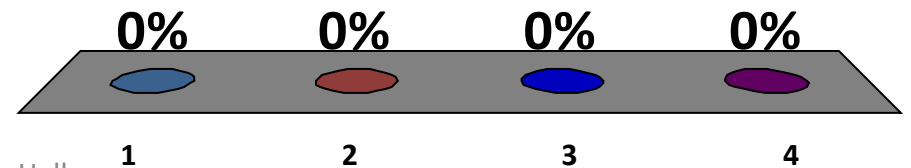


Bits and Bytes

- The language of computers
 - Bit
 - Binary digit
 - 0 or 1
 - Byte
 - 8 bits
- Each letter, number, or character is a unique combination of 8 bits of 0s and 1s

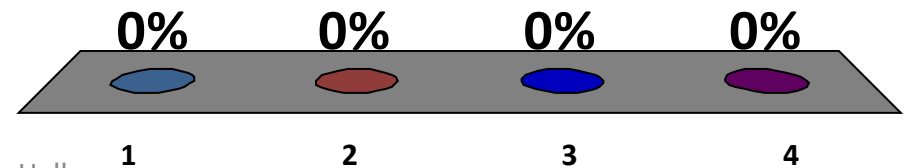
How many bits are in a byte?

1. 2
2. 4
3. 6
4. 8



So, what's a nibble?

1. 1 bit
2. 2 bits
3. 4 bits
4. 6 bits



How Much Is a Byte?

Name	Abbreviation	Number of Bytes
Byte	B	1 byte
Kilobyte	KB	1,024 bytes (2^{10})
Megabyte	MB	1,048,576 bytes (2^{20} bytes)
Gigabyte	GB	1,073,741,824 bytes (2^{30} bytes)
Terabyte	TB	1,099,511,627,776 bytes (2^{40} bytes)
Petabyte	PB	1,125,899,906,842,62 bytes (2^{50} bytes)
Exabyte	EB	1,152,921,504,606,846,976 bytes (2^{60} bytes)
Zettabyte	ZB	1,180,591,620,717,411,303,424 bytes (2^{70} bytes)

I know how to perform binary math using the calculator found within the Windows operating system.

1. True
2. False



Processing Bits and Bytes

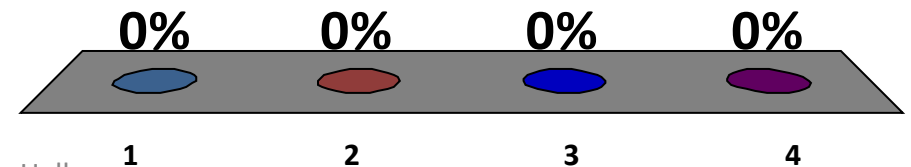
- Computer uses combination of hardware and software to process data into information
 - *Hardware* is any part of the computer you can physically touch
 - *Software* is set of computer programs
 - Application software
 - System software
 - Operating system (OS)

Types of Computers

- Two basic designs of computers
 - Portable
 - Notebook computers
 - Netbooks
 - Tablet PCs
 - Stationary
 - Desktop computers
 - Separate case plus peripheral devices
 - All-in-one computers

Which of the following is *NOT* a portable computer?

1. All-in-one computer
2. Netbook
3. Tablet
4. Notebook

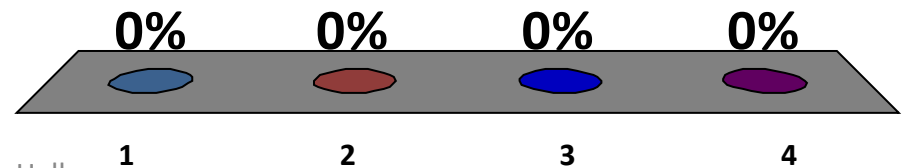


Other Types of Computers

- Mainframe
 - Supports hundreds of users simultaneously
- Supercomputer
 - Performs complex calculations extremely rapidly
- Embedded
 - Self-contained computer devices performing dedicated functions

Which of the following is *NOT* an input device?

1. Scanner
2. Monitor
3. Stylus
4. Microphone



Input Devices

- Devices used to enter data and instructions into the computer
- Most common input devices:
 - Keyboards to enter typed data and commands
 - Mouse to enter responses and commands
- Other input devices:
 - Microphone to input sounds
 - Scanner to input nondigital text
 - Digital camera to input digital images
 - Stylus to tap commands or draw on screen

Keyboards

- QWERTY layout is standard on most PCs
- Dvorak keyboard puts most commonly used letters on “home keys”
- Notebook keys have alternate functions when used in conjunction with the Fn (function) key
- Wireless keyboards work via radio frequencies

Mice

- Optical mouse
 - Internal sensor or laser detects movement
 - Moves pointer on the screen
- Wireless mouse
 - Optical and trackball
 - Data sent by radio frequency or Bluetooth technology

New Mouse Features

- Magnifier
- Customizable buttons
- Web search
- File storage

Other Pointing Devices

- Touch pads and trackpoint devices
- Take place of mouse on notebooks



Input Devices for Games

- Game controllers send data to computer
 - Joysticks
 - Game pads
 - Steering wheels
- Force-feedback joysticks and steering wheels deliver data in both directions
- Most game controllers are wireless

Touch Screens

- Display screen that responds to commands by touch with finger or stylus
- Becoming popular on many computing devices
 - Smartphones
 - Tablet PCs
 - All-in-one desktop PCs
 - Portable media players

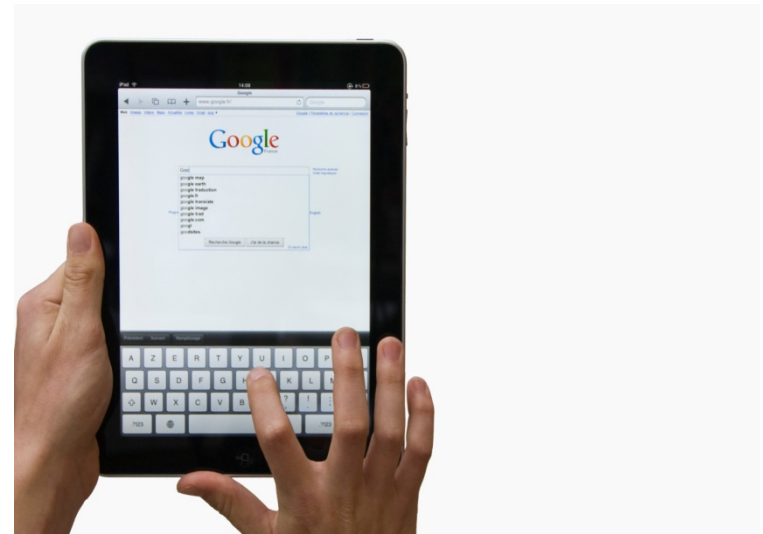


Image Input

- Digital cameras, camcorders, cell phones
 - Capture pictures and video
 - Used in remote settings
- Scanners
 - Create digital image
- Webcams
 - Capture and transmit live video
 - Used for videoconferences



Sound Input

- Microphones capture sound waves and transfer them to digital format
- Sound input allows:
 - Video conferencing
 - Audio conferencing
 - Chatting with friends or family over the Internet instead of using a phone
 - Recording podcasts

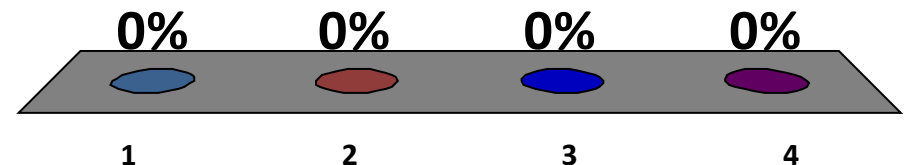
Types of Microphones

- Unidirectional
- Omnidirectional
- Bidirectional
- Clip-on microphones
- Close-talk microphones



Which type of microphone picks up sound from all directions?

1. Unidirectional
2. Omnidirectional
3. Bidirectional
4. Multidirectional



Input Devices for the Physically Challenged

- Visual impairments
 - Voice recognition
 - Keyboards with larger keys
 - Touch-screen keyboards
- Motor control issues
 - Special trackballs
 - Head-mounted pointing devices

Output Devices

- Enable you to send processed data out of the computer in the form of text, pictures, sounds, or video
 - Monitors
 - Printers
 - Speakers and earphones

Monitor Types

- Liquid crystal display (LCD)
 - Flat panel
 - Light and energy efficient
- Light-emitting diode (LED)
 - More energy efficient than LCD monitors
 - Better color accuracy and thinner panels
- Organic light-emitting diode (OLED)
 - Use organic compounds that produce light

Organic Light-Emitting Diode Monitors

- Because they do not need a backlight, OLED displays are much thinner



How LCD Monitors Work

- Screens are grids made up of millions of tiny dots called pixels
- Each pixel is composed of red, blue, and green subpixels (and sometimes yellow)
- Two or more sheets of material are filled with liquid crystal solution
- Crystals block or let light shine through to cause images to form on the screen

Choosing an LCD Monitor

- Aspect ratio
- Resolution
- Contrast ratio
- Viewing angle
- Brightness
- Response time

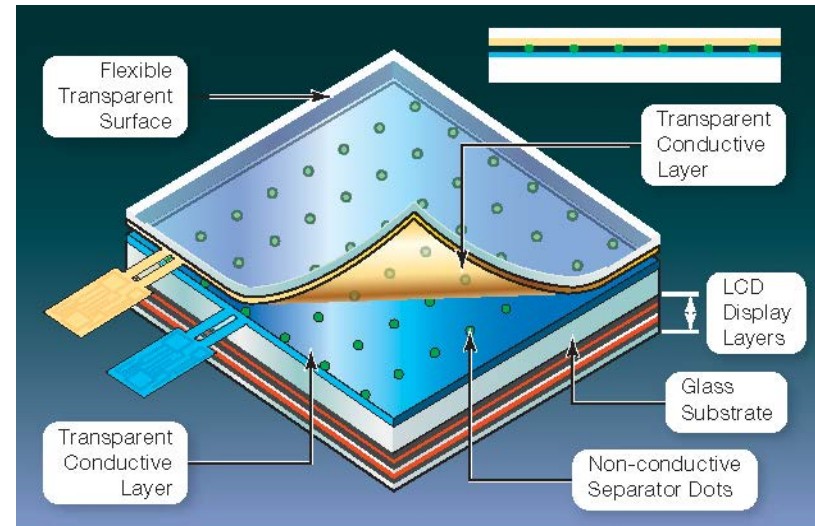


Size May Matter

- Bigger the monitor, the more you can display
- 27-inch monitor
 - 2560 x 1440 pixels
- 21.5-inch monitor
 - 1680 x 1050 pixels
- HD-DVDs and Blu-ray movies
 - Require at least 1920 x 1080 pixels

Touch Screen Technology

- Used in smartphones, tablets, notebook, and desktop monitors
- Finger or stylus is placed on screen
- Changes the state that the device is monitoring



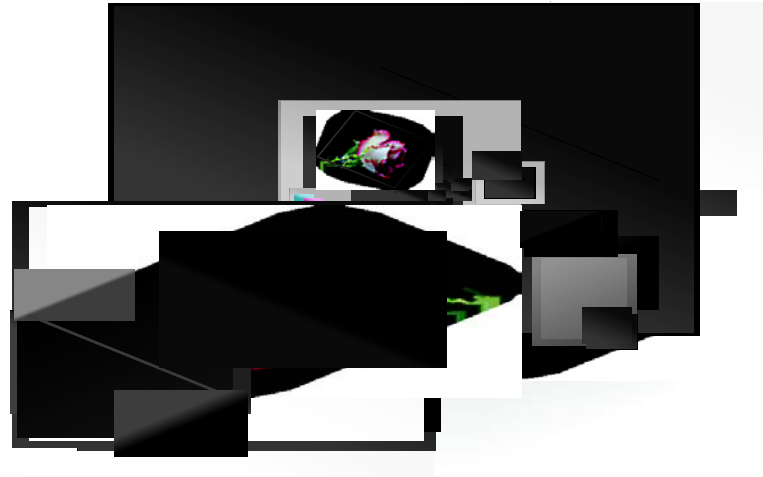
Capacitive system detects touches and translate them into meaningful commands

Printers

- Inkjet printers
 - Spray tiny drops of ink onto page
- Laser printers
 - Use laser beams and static electricity to deliver toner to page
- Nonimpact printers have replaced impact printers almost entirely

Nonimpact Printers

- Inkjet
 - Affordable
 - High-quality color printouts
 - Quick and quiet



- Laser
 - Faster printing speed
 - Higher-quality printouts
 - More expensive

Specialty Printers

- All-in-one printer
 - Functions as printer, scanner, copier, and fax
- Plotter
 - Used to print oversize images
- Thermal printer
 - Emerging as popular technology for mobile and portable printing

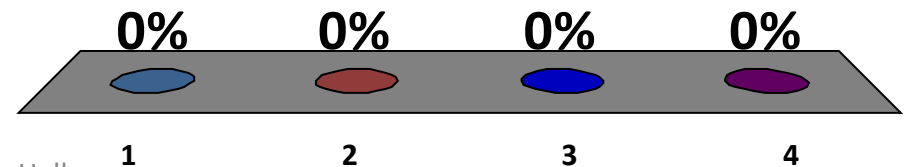


Selecting a Printer

- Decide your primary printing need first
 - Speed (pages per minute)
 - Resolution (dots per inch)
 - Color output
 - Use and cost
 - Cost of consumables

Which type of printer is used to print oversized images?

1. All-in-one printer
2. Thermal
3. Plotter
4. Ink jet



Sound Output

- Speaker is output device for sound
 - Inexpensive speakers come with computers
 - Surround-sound speakers
 - Wireless speaker systems
- Headphones or earbuds avoid distracting others

Processing and Memory on the Motherboard

- Main circuit board that contains the central electronic components of the computer
- CPU
- ROM, RAM and cache
- Slots for expansion cards



Memory

(RAM)

Random access memory

- Stores instructions and data
- Series of several memory cards or modules
- Temporary (volatile) storage

(ROM)

Read-only memory

- Stores startup instructions
- Permanent (nonvolatile) storage

I know how to determine the amount of RAM and the type of CPU in my computer.

1. True
2. False

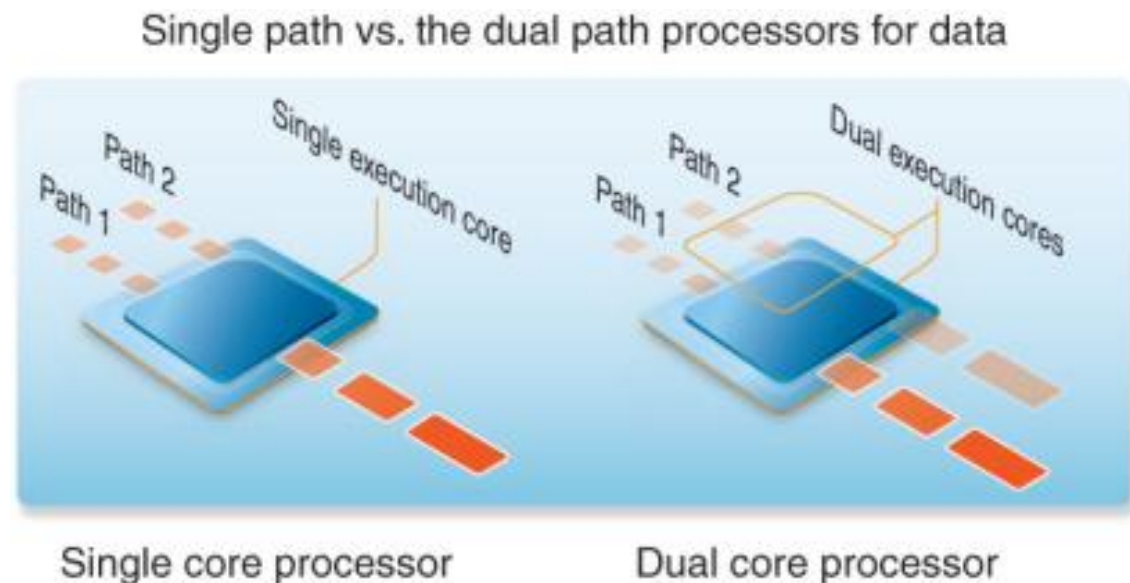


Central Processing Unit

- Also called CPU or processor
- Referred to as the “brains” of the computer
- Controls all functions performed by the computer’s other components
- Processes all commands and instructions
- Can perform billions of tasks per second

CPU Performance Measures

- Processor speed measured in hertz (Hz)
 - Megahertz (MHz) or Gigahertz (GHz)
- Number of cores
 - Single
 - Dual
 - Quad
 - Eight



Hard Drive

- Primary device for permanent storage
- Holds stored programs and data

Internal



External



Drive Bays

- Internal drive bays
 - Reserved for internal hard drives
- External drive bays
 - House CD or DVD drives
 - Empty drive bay
 - Notebook expansion attaches external drive via USB port



Portable Storage

- External hard drives
 - Large portable storage needs
 - Small and lightweight
 - Attach to computer via USB port
 - Care must be taken when transporting

Flash Storage

- Flash drive, jump drive, USB drive, thumb drive
 - Use solid state flash memory
 - No moving parts
 - Significant storage capacity
 - Plug into USB ports
 - Appears as another disk drive



I know how to safely remove flash storage from a computer.

1. True
2. False



Optical Storage

- Compact discs (CDs)
 - Initially used to store audio files
- Digital video discs (DVDs)
 - Store more data than CDs
 - One-side/one layer
 - Double-sided/single layer
 - Double-sided/double layer
- Blu-ray discs (BDs)

Connecting Peripherals

- A port is a place through which a peripheral device attaches to computer
- Many ports are located on back of computer
- Some commonly used ports are placed on front and sides for easier access

High Speed and Data Transfer Ports

- Universal serial bus (USB) is most common port type used to connect input and output devices to computer
- USB 2.0 port is current standard
 - Transfer data at 480 megabits per second
- New USB 3.0 standard provides transfer speeds that are 10 times faster
 - Should quickly become the port of choice

Other Types of Ports

- FireWire 400
 - Move data at 400 Mbps
- FireWire 800
 - Doubles rate to 800 Mbps
- FireWire 3200
 - Has been ratified
 - Yet to reach market

Connectivity and Multimedia Ports

- Connectivity port can give access to networks and the Internet
 - Ethernet port
 - Modem port
- Video ports
 - Connect monitors and multimedia devices
- Audio ports
 - Connect headphones, microphones, speakers

Adding Ports

- Expansion cards
 - New port standards
- Expansion hubs
 - Enable several devices to be connected to a port



expansion card



expansion hub

Power Controls

- Power supply transforms wall voltage to voltages required by computer chips
- Cold boot: powering on your computer from a completely turned off state
- Power off computer properly
 - Save energy
 - Keep computer more secure
 - Ensure data is saved



Power Management Options



Define power buttons and turn on password protection

Choose the power settings that you want for your computer. The changes you make to the settings on this page apply to all of your power plans.

Power and sleep button settings

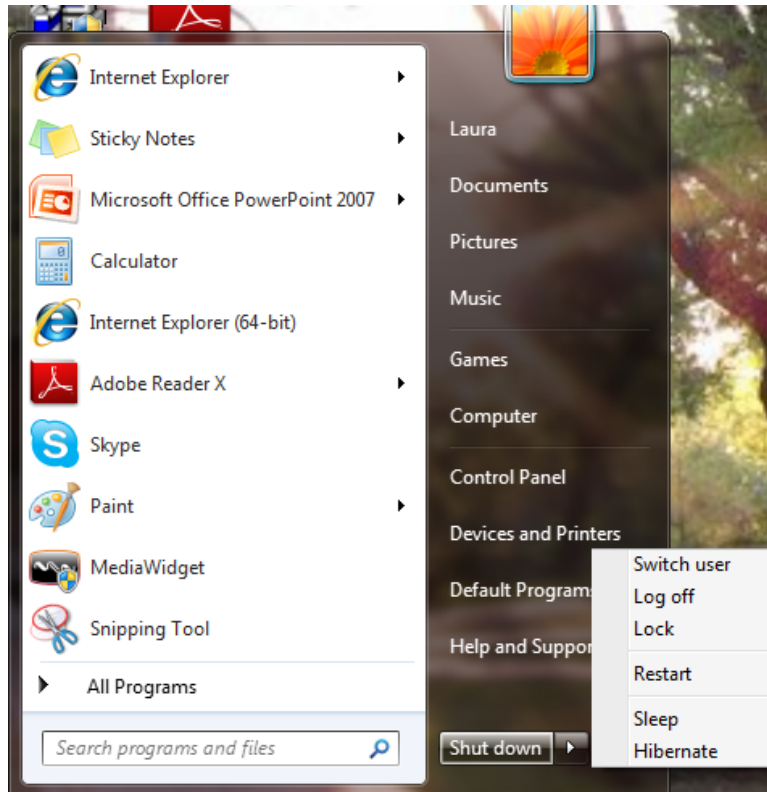
-  When I press the power button: Shut down
-  When I press the sleep button: Sleep

Password protection on wakeup

Change settings that are currently unavailable

- Require a password (recommended)
When your computer wakes from sleep, no one can access your data without entering the correct password to unlock the computer. [Create or change your user account password](#)
- Don't require a password
When your computer wakes from sleep, anyone can access your data because the computer isn't locked.

Windows 7 Start Menu



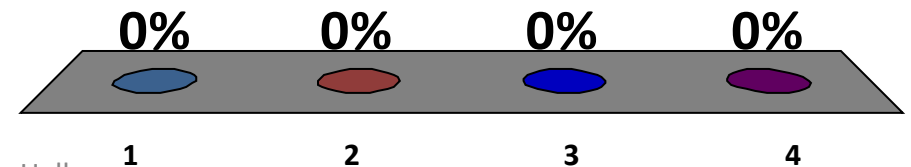
- Restart
 - Warm boot
- Shut Down
 - Power down
- Sleep
 - All documents and data remain in RAM
- Hibernate
 - Stores data in RAM and saves to hard drive

Setting It All Up

- Ergonomics refers to how you set up your computer to minimize risk of injury, discomfort, or eyestrain
- Guidelines to follow:
 - Position monitor correctly
 - Use adjustable chair
 - Assume proper position while typing
 - Take breaks from computer
 - Ensure that lighting is adequate

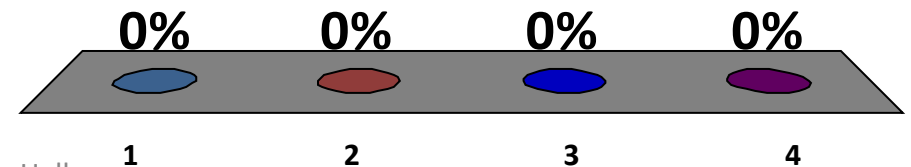
Which of the following is larger than a Gigabyte?

1. Kilobyte
2. Terabyte
3. Megabyte
4. All of the above



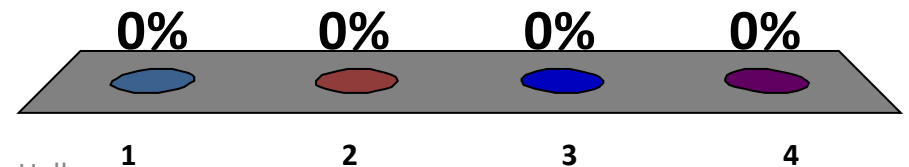
Which type of computer conducts intensive mathematical calculations for weather forecasting or other types of research?

1. All-in-one computer
2. Mainframe
3. Embedded
4. Supercomputer



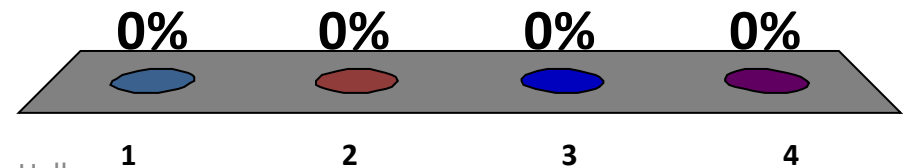
Which of the following is the width to height proportion of a monitor?

1. Aspect ratio
2. Contrast Ratio
3. Viewing Angle
4. Resolution



Which of the following stores the computer's startup instructions?

1. Hard drive
2. RAM
3. ROM
4. Motherboard



Chapter 2 Summary Questions

1. What exactly is a computer, and what are its four main functions?

Chapter 2 Summary Questions

2. What is the difference between data and information?

Chapter 2 Summary Questions

3. What are bits and bytes, and how are they measured?

Chapter 2 Summary Questions

4. What devices do I use to get data into the computer?

Chapter 2 Summary Questions

5. What devices do I use to get information out of the computer?

Chapter 2 Summary Questions

6. What's on the motherboard?

Chapter 2 Summary Questions

7. Where are information and programs stored?

Chapter 2 Summary Questions

8. How are devices connected to the computer?

Chapter 2 Summary Questions

9. How do I set up my computer to avoid strain and injury?



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