

IT ESSENTIALS V. 4.1
Module 1
INTRODUCTION TO THE PERSONAL COMPUTER

1.0 Introduction		
1.	What is information technology?	The design, development, implementation, support, and management of computer hardware and software applications
1.1 Explain IT Industry Certifications		
1.1.1 Identify education and certifications		
1.1.2 Describe the A+ Certification		
2.	Who developed the A+ certification program?	CompTIA
3.	What does A+ certification signify?	That a candidate is a qualified PC hardware and software technician
4.	What does the A+ Essentials exam measure?	It tests for the fundamentals of computer technology, networking and security, communication skills and professionalism required of all entry-level IT professionals.
Worksheet – Job Opportunities		
1.1.3 Describe the EUCIP certificate		
5.	What are the five modules of the EUCIP IT Administrator Certificate?	PC hardware, operating systems, local area network and network services, expert network use and IT security
1.2 Describe a Computer System		
6.	What makes up a computer system?	Hardware and software components
7.	What is hardware?	Physical equipment
8.	What are examples of hardware?	Case, storage drives, keyboards, monitors, cables, speakers, printers
9.	What is software?	The operating system and programs
10.	What does the operating system do?	Instructs the computer how to operate
1.3 Identify the names, purposes, and characteristics of cases and power supplies		
11.	What does the computer case do?	Provides protection and support for the internal components of the computer
12.	What determines the size and shape of the computer case?	The motherboard and internal components
13.	How large should the computer case be?	Durable, easy to service, enough room for expansion
14.	How large should the power supply be?	Large enough to supply enough power for the components that are currently installed and allow additional components to be added at a later time
1.3.1 Describe cases		
15.	What does a computer case contain?	The framework to support the internal components of a computer while providing an enclosure for added protection

16.	What are computer cases made of?	Plastic, steel, and aluminum
17.	What are the size and layout of a case called?	Form factor
18.	What are the basic form factors for computer cases?	Desktop, tower
19.	What factors must be considered when choosing a case?	Size of motherboard, number of external or internal drive locations, available space
20.	How are internal components grounded?	Attaching to the case
1.3.2 Describe Power Supplies		
21.	What does a power supply do?	Converts AC power coming from the wall into DC power
22.	What can protect a computer from problems caused by a change in power?	UPS – Uninterruptible Power Supply
23.	What does a power inverter do?	Provides AC power to the computer from a built-in battery by converting DC current of the UPS battery into AC power
24.	What is a keyed connector?	Designed to be inserted in only one direction
25.	What is a molex connector used to connect?	An optical drive or a hard drive
26.	What does a berg connector connect?	A floppy drive
27.	What kind of connection is used to connect the motherboard?	20 or 24 pin slotted connector
28.	What is the voltage of the yellow wire?	+12 V
29.	What is the voltage of the blue wire?	-12 V
30.	What is the voltage of the orange wire?	+3.3 V
31.	What is the voltage of the red wire?	+5 V
32.	What is the voltage of the white wire?	-5 V
33.	What color is the ground wire?	black
34.	What are the four basic units of electricity?	Voltage (V), current (I), Power (P), Resistance (R)
35.	What is voltage?	A measure of the force required to push electrons through a circuit
36.	What is current?	A measure of the amount of electrons going through a circuit
37.	How is current measured?	In amps
38.	What is power?	A measure of the pressure required to push electrons through a current (voltage) multiplied by the number of electrons going through that circuit (current)
39.	What is the measurement of power?	Watts
40.	What is resistance?	the opposition to the flow or current in a circuit
41.	How is resistance measured?	Ohms
42.	Lower resistance allows _____ current	More or Less (circle the correct answer)
43.	What is Ohm's Law?	$V=IR$
44.	What will result in higher power?	Increasing the current or voltage

1.4 Identify the names, purposes, and characteristics of internal components		
1.4.1 Identify the names, purposes, and characteristics of motherboards		
45.	What is the motherboard?	The main printed circuit board that contains the buses
46.	What is a bus?	Electrical pathway
47.	What are other names for the motherboard?	System board, backplane, or mainboard
48.	What items are on the motherboard?	CPU, RAM, expansion slots, heat sink/fan assembly, BIOS chip, chipset and embedded wires
49.	What does form factor refer to?	Size and shape of the board
50.	What does the form factor determine?	How individual components attach to the motherboard and the shape of the computer case
51.	What is the most common form factor in desktop computers?	AT
52.	What is the newer motherboard form factor?	ATX
53.	What is the chipset?	Integrated circuits attached to the motherboard that control how system hardware interacts with the CPU and motherboard
54.	What determines the type of CPU that can be installed?	The socket on the motherboard
55.	What are the two components that make up the chipset?	Northbridge and Southbridge
56.	Which component controls access to the Ram, video card and the speeds at which the CPU can communicate with them?	Northbridge
57.	Which component allows the CPU to communicate with the hard drives, sound card, USP ports and other I/O ports?	Southbridge
1.4.2 Identify the names, purposes, and characteristics of CPUs		
58.	What is the brain of the computer?	CPU
59.	Who are the most common CPU manufacturers?	Intel, AMD
60.	What is the connector that interfaces between the motherboard and the processor?	CPU socket or slot
61.	What is PGA?	Pin Grid Array
62.	What is ZIF?	Zero Insertion Force
63.	What does ZIF refer to?	The amount of force needed to install a CPU into the motherboard socket or slot
64.	What is PGA architecture?	The pins on the underside of the processor are inserted into the socket
65.	What is a program?	A sequence of stored instructions
66.	What are the two major CPU architecture	RISC and CISC

	instruction sets?	
67.	What does RISC stand for?	Reduced Instruction Set Computer
68.	What does CISC stand for?	Complex Instruction Set Computer
69.	Which architecture takes fewer steps per operation?	CISC
70.	What is hyperthreading?	The CPU has multiple pieces of code being executed simultaneously on each pipeline
71.	How is the power of a CPU measured?	By the speed and amount of data that it can process
72.	How the speed of a CPU rated?	Cycles per second; ie MHz or GHz
73.	What determines the amount of data that a CPU can process at one time?	The size of the processor data bus
74.	The wider the processor bus, the more _____ the processor.	Powerful
75.	What size processor data bus do current processors have?	32 bit or 64 bit
76.	What is overclocking?	A technique used to make a processor work at a faster speed than its original specifications
77.	Is overclocking a reliable way to improve computer performance?	No
78.	What is CPU throttling?	When the processors runs at less than the rated speed to conserve power or produce less heat
79.	What is MMX?	A set of multimedia instructions built into Intel processors
80.	What has replaced MMX?	SSE – Streaming Single-Instruction-Multi-date Extensions
81.	What is a single core CPU?	One core inside a single CPU that handle all of the processing capability
82.	What are the most common multiple core processors?	Dual Core, Triple Core, and Quad Core
83.	Why would you use a Quad Core CPU?	Enhanced software applications
1.4.3 Identify the names, purposes, and characteristics of Cooling Systems		
84.	What causes heat?	The flow of current within the components
85.	How can you remove heat?	Increasing air flow
86.	What makes the cooling process more efficient?	A case fan
87.	How does a water-cooling system work?	A metal plate is placed over the processor and water is pumped over the top to collect the heat the CPU creates
1.4.4. Identify the names, purposes, and characteristics of ROM and RAM		
88.	What does ROM stand for?	Read Only Memory
89.	What is stored in ROM?	Basic instructions for booting the computer and loading the operating system
90.	What is another name for ROM?	Firmware
91.	Do ROM chips retain their contents when	Yes

	the computer is powered down?	
92.	What are the different types of ROM?	PROM, EPROM, EEPROM
93.	Can a PROM chip be erased or rewritten?	No
94.	Which h type of PROM can be erased and rewritten without having the remove the chip from the computer?	EEPROM
95.	What does RAM stand for?	Random Access Memory
96.	What is meant by volatile memory?	The contents are erased when the computer is powered off
97.	Why would you want to have more RAM in a computer?	The more capacity the computer has to hold and process large programs and files, to enhance system performance
98.	What are the different types of RAM?	DRAM, SRAM, FPM Memory, EDO memory, SDRAM, DDR SDRAM, DDR2, DDR3, RDRAM
99.	Which type of RAM speeds up the access time to retrieve data from memory because the CPU does not have to wait for one data access cycle to end before another begins?	EDO memory
100.	What are the different types of memory modules?	DIP, SIMM, DIMM, RIMM, SODIMM
101.	What are the two configurations of SIMM chips?	30 pin and 72 pin
102.	What type of DIMM chips are there?	168 pin SDRAM, 184 pin DDR, 240 pin DDR2
103.	What is the configuration of the RIMM modules?	184 pin
104.	What is SODIMM used for?	Laptops, printers, or devices where conserving space is desirable
105.	What does the speed of memory impact?	How much data a processor can process because faster memory improve the performance of the processor
106.	What does DDR technology do?	Doubles the maximum bandwidth of SDRAM
107.	What is cache memory used for?	To store the most frequently used data
108.	What are the three types of cache memory?	L1, L2, L3
109.	When do memory errors occur?	When the data is not stored correctly in the RAM chips
110.	What are the three methods of error checking?	Non-parity, parity, ECC
1.4.5 Identify the names, purposes, and characteristics of adapter cards		
111.	What do adapter cards do?	Increase the functionality of a computer by adding controllers for specific devices or by replacing malfunctioning ports
112.	Why would you use adapter cards?	To expand and customize the capability of the computer
113.	What does SCSI stand for?	Small Computer System Interface
114.	What does RAID stand for?	Redundant Array of Independent Disks

115.	What does USB stand for?	Universal Serial Bus
116.	What expansion slot is used for video adapters?	AGP
117.	What expansion slot is an IBM proprietary 32-bit expansion slot?	MCA
118.	What was used in computer systems with e LPX form factor to allow adapter cards to be installed horizontally?	Riser card
1.4.6 Identify the names, purposes, and characteristics of storage drives		
119.	What do storage drives do?	Read or write information to magnetic or optical storage media
120.	What are some common types of storage devices?	Floppy drive, hard drive, optical drive, flash drive
121.	What does a floppy drive used for storage?	A removable 3.5 inch floppy disk
122.	What is the storage capacity of a floppy disk?	720 KB or 1.44 MB
123.	What does the hard drive contain?	The operating system and applications
124.	How is the storage capacity of a hard drive measured?	Billions of bytes or gigabytes (GB)
125.	How is the speed of a hard drive measured?	Revolutions per minutes (RPM)
126.	How do magnetic hard drives spin magnetic platters and drive heads?	With a drive motor
127.	Do solid state drives (SSDs) have moving parts?	No
128.	How do optical drives read data on optical media?	With lasers
129.	What are three types of optical drives?	Compact Disc (CD), Digital Versatile Disc (DVD), Blu-Ray Disc (BD)
130.	What is the storage capacity of a CD?	720 MB
131.	What is the storage capacity of a DVD?	4.3 GB single-layer 8.5 GB dual-layer
132.	What is the storage capacity of a BD?	25 GB single-layer 50 GB dual-layer
133.	Which optical media is a CD that can be recorded, erased, and re-recorded?	CD-RW
134.	Which optical media is a DVD that can be recorded one time?	DVD +/- R
135.	Which optical media contains pre-recorded movies, games, or software?	BD-ROM
136.	Which optical media can record HD video and PC data storage one time?	BD-R
137.	What is another name for an external flash drive?	Thumb drive, jump drive
138.	Which type of hard drive interface uses a 40-pin connector?	IDE and EIDE

139.	What size connector does the SATA interface use?	7 pin data connection
140.	Which cable can be up to 2 meters in length?	eSATA
141.	How many devices can a SCSI controller connect?	15
142.	What type of connector do SCSI interfaces use?	50-pin, 68-pin, or 80-pin connector
143.	What is RAID used for?	Provides a way to store data across multiple hard disks for redundancy
144.	What are the terms that describe how RAID stores data on various disks?	Parity, striping, mirroring
145.	What is the advantage of RAID 0?	Highest performance
146.	What are the advantages of RAID 5?	Supports multiple simultaneous reads and writes; data is written across all drive with parity, data can be rebuilt from information found on other drives
147.	How many drive are required for RAID 5?	Minimum of 3
1.4.7 Identify the names, purposes, and characteristics of internal cables		
148.	What kind of power connector is needed for PATA drives?	Molex
149.	What kind of power connector is needed for floppy drive?	Berg 4-pin
150.	How many types of SCSI data cables are there?	3
151.	What are the types of SCSI data cables?	Narrow – 50-pin connector Wide – 68-pin connector Alt4 – 80-pin connector
152.	What does a colored stripe on a cable indicate?	Pin 1
Worksheet: Research Computer Components		
1.5 Identify the names, purposes, and characteristics of ports and cables		
153.	Describe a serial port.	DB9 or DB25 male connector
154.	What is the maximum length of a serial cable?	50 ft
155.	What type of connector is used for a telephone cable?	RJ11
156.	How many devices can a single USB port in a computer support?	127
157.	What is the transmission speed of USB 2.0?	480 Mbps
158.	What is Firewire?	A high-speed, hot-swappable interface that connects peripheral devices to a computer
159.	How many devices can a single Firewire port support?	63
160.	What standard does Firewire us?	IEEE 1394
161.	What is the difference between 1394A and 1394B?	1394 A – data rate 400 Mbps, cable length 15 ft, 4 or 6 pin connector

		1394 B – greater range of connections including Cat 5 and fiber; 3.2 Gbps
162.	What type of parallel connector is used for a printer?	Type B 36-pin Centronics
163.	How much data can a parallel cable transport at one time?	8 bits
164.	What is the standard for parallel cable?	IEEE 1284
165.	What is the maximum length of a parallel cable?	15 feet
166.	If a single SCSI device is connected to a SCSI port, how long can the cable be?	80 feet
167.	Where should SCSI devices be terminated?	At the endpoints of the chain
168.	What is another name for a network port?	RJ45
169.	What is the maximum length of a network cable?	328 feet
170.	What does a PS/2 port connect?	Mouse, keyboard
171.	What kind of a connector does a PS/2 port use?	6-pin mini-din female connector
172.	What are three common video ports?	S-video, VGA, DVI
173.	Which video port provides analog output to a monitor?	VGA
174.	Which video port provides an uncompressed digital output to a monitor?	DVI
175.	How many cables does a RGB cable have?	3 (red, green, blue)
1.6 Identify the names, purposes, and characteristics of input devices		
176.	What is an input device used for?	To enter data or instructions into a computer
177.	What are the two most commonly used input devices?	Mouse, keyboard
178.	What is a hardware device that can be used to control more than one computer using a single keyboard, monitor, and mouse	KVM Switch (Keyboard, Video, Mouse)
179.	What is used for biometric identification?	A feature that is unique to an individual user such as a fingerprint, retinal scanner, or voice recognition
180.	What causes a touch screen to work?	Pressure-sensitive transparent panel
181.	What does a scanner do?	Digitizes an image or document
182.	What type of scanner reads UPC bar codes?	Bar code reader
1.7 Identify the names, purposes, and characteristics of output devices		
183.	What is an output device used for?	To present information to the user from a computer
184.	What are the primary output devices for a computer?	Monitors and projectors, printers
185.	What are the three types of monitors?	LCD, CRT, Projector
186.	What is the important difference between monitor types?	The technology used to create an image

187.	How is the image created on the screen in CRT technology?	The combination of glowing and non-glowing areas
188.	Which technology is commonly used in flat panel monitors and laptops?	LCD
189.	What is the difference between active matrix and passive matrix?	Active matrix allows each pixel to be controlled which creates very sharp color images
190.	How does DLP technology work?	A spinning color wheel works with a micromirror device; each mirror corresponds to a specific pixel; each mirror reflects light toward or away from the projector optics
191.	What does monitor resolution refer to?	The level of image detail that can be reproduced
192.	What is a pixel?	Picture element; tiny dots that comprise a screen
193.	What is dot pitch?	The distance between pixels on the screen
194.	Which dot pitch produces a better image?	A lower dot pitch number
195.	What is the contrast ratio?	A measurement of the difference in intensity of light between the brightest point and the darkest point
196.	What is the refresh rate?	How often per second the image is rebuilt
197.	Does a higher or lower refresh rate produce a better image?	higher
198.	What is the horizontal resolution?	The number of pixels in a line
199.	What is the vertical resolution?	Number of lines in a screen
200.	What is color resolution?	The number of colors that can be reproduced
201.	What is aspect ratio?	The horizontal to vertical measurement of the viewing area of a monitor
202.	What is native resolution?	The number of pixels that a monitor has
203.	What is a printer?	An output device that creates hard copies of computer files
204.	What is an all-in-one type printer?	Provides multiple services such as printing, scanning faxing, and copying
1.8 Explain System Resources and Their Purposes		
205.	What are the three common resources?	IRQ, I/O Port Addresses, DMA
206.	What does IRQ stand for?	Interrupt Request
207.	What does DMA stand for?	Direct Memory Access
208.	What is an IRQ used for?	For computer components to request information from the CPU
209.	How many IRQs are there?	16
210.	How is the priority of the request determined?	By the IRQ number
211.	Fill in the IRQ Chart	0 - System Timer 1 - Keyboard Controller 2 - 2 nd IRQ Controller Cascade

		3 – Serial 2 (Com 2) 4 – Serial 1 (Com 1) 5 – Serial/Parallel 2 (LPT2) 6 – Floppy Drive 7 – Parallel 1 (LPT1) 8 – Real-Time Clock 9 - Available 10 - Available 11 - Available 12 – Mouse Port/Available 13 – Math Co-Processor 14 – Primary IDE 15 – Secondary IDE
212.	What are I/O port addresses used for?	To communication between devices and software
213.	How many I/O ports are in a computer?	65,535
214.	Fill in the I/O Port Chart	Com 1 – 3f8 Com 2 – 2f8 Com 3 – 3e8 Com 4 – 2e8 LPT1 – 378 LPT2 – 278
215.	What devices use DMA channels?	High-speed devices
216.	How many DMA channels are there?	8
217.	Fill in the DMA Channel Chart	0 – Sound 1 – Sound 2 - Floppy Drive Controller 3 – LPT 1 in ECP mode 4 – Cascade for DMA 0-3 5 – Sound 6 - Available 7 – Available