

Exercise 1 question content for note-taking

This listing of online exercise contents is for your convenience as a study aid. You need to establish a free account on the online system to do this exercise. To complete a question on this exercise you simply place a checkmark in the box in front of each statement that is **true**. If you score less than 10 on a question you need to review the indicated material and try that question again.

A printed listing of pages 28-33 is the best way to use these "question content" pages. Mark them to keep notes as you read the e-book and view the videos, before trying the exercise. Then, since you can repeat the exercise any number of times, do just one question on it and click "submit all" to have it graded immediately. Review the unit's material and repeat work on that one question until you achieve a perfect score of 10 on it before you move on to the next question.

Keep notes of your answers so and use them to do all five questions in your last exercise try and get a perfect score on the whole exercise. **This is not a quiz, it's a learning tool! Don't regard this as a quiz and don't leave this until the end of a unit.**

Question 1.1



- Signaling is actually the communication of a message from one place to another without the use of human speech.
- Signals can be used to communicate because everyone has agreed, ahead of time, what the signals mean.
- "Event/meaning" communication can't deal with messages that are needed for unexpected conditions.
- In some written human languages a given symbol stands for a thing, not a letter.
- With three objects that can be in one of two "states" we can represent a maximum of $2 + 2 + 2 = 6$ different conditions.
- With two off/on conditions we can represent 4 different situations.
- We need to represent about 90 different characters to be able to convey an English-language message using some form of code.

- With ASCII code expressed in 8 different binary objects we can express at most 128 different characters which is far more than needed to be able to convey a message in English.
- Computers would not do us any good if we could not communicate information to them and receive information back from them.
- If we used four m&m's each of which could be one of two colors, we could represent a total of $2 \times 2 \times 2 \times 2 = 16$ different messages or characters.

Question 1.2



- The on/off pattern housed as electrical charges in the computer's memory, representing stored information, can be copied to other forms of media such as a USB flash drive to preserve and transfer them to another computer or sent to a printer to interpret them in printed form.
- Sound, images, and movies can each be represented in various ways in specialized files of information, but in all cases what is stored is not the item itself but the information needed to electronically reconstruct the item.
- Information is stored in 8-bit units called bytes but the organization of the digital bits is not always in ASCII form; it may instead be in a coded form representing information to reconstruct sounds or images as dictated by the way .mp3 and .jpg files are organized.
- When a computer is shut off the hard drive on it resets and all information stored on it is lost.
- It is possible to manipulate information stored as electrical charges to copy it, sort it, compare and select it, and make decisions based on it by using circuits built up with electronic logic "gates."
- Electronic gates can channel information by sensing how bits are set (either with an electric charge [1], or lacking an electric charge [0]).
- When data is copied from computer memory to a CD or USB drive it is erased from computer memory.

- Huge amounts of information can be stored in a small space when the bits representing the information are stored as electrical or magnetic charges because these charges can be miniaturized to sub-microscopic dimensions.
- An on/off code is placed in computer memory in eight memory "bits" for each ASCII character stored, and each such bit can hold one on/off electrical charge.
- Every time you press a key at the keyboard of a computer (which is operating) the result is that an 8-bit ASCII-coded character is placed into computer memory.

Question 1.3



- An SD card is a "Secure Digital Memory Card"; it provides electronic storage for digital cameras, cell phones and extra memory in some computers.
- The memory to store one ASCII character (8 bits) is called a "byte."
- "Universal Serial Bus", a standard connector that connects an external device to a computer so data can be transferred between devices, is being replaced with several other forms of connectors to simplify computers.
- Modern personal computer processors now typically operate at speeds of 1 to 3 gigahertz (GHz), which is 1,000,000,000 to 3,000,000,000 operations per second, where "giga" means "billion."
- Android is an "open source" (free) operating system developed by Google to compete with Microsoft Windows and the Apple iPhone to support the mobile use of small computer devices.
- All of the billions of bytes of memory of a modern small computer lose the information stored there when power is removed (when the computer is shut off).
- E-pub is an open standard format for e-books that is supported by many different brands of e-readers.

- "Tablet computer" is the general term for a computer that has a screen that responds to the touch of a finger or perhaps a stylus that looks like a pen.
- "Flash" memory is a type of electronic memory that does not lose its information content when electrical power is removed from it.
- Ubuntu provides an alternative graphical user interface (GUI) similar to the appearance and functionality of Windows and the Mac and competes with those products.

Question 1.4



- A chip contains a sliver of silicon less than an inch square on which engineers etch microscopic transistors and connecting wires; the transistors act as switches that control the flow of currents in the wires to process the binary code of computers.
- The memory in a desktop computer is almost always implemented physically in two ways: in semiconductor memory (silicon-based miniature circuit components mounted on the motherboard close to the processor) and in a "hard drive" electromechanical device.
- A pre-recorded audio CD starts as a disc of clear polycarbonate plastic 1.2 millimeter thick; during manufacture billions of marks representing digital bits are pressed into the plastic in a spiral-the bits encode digital data that can be used to reconstruct the original sound.
- Inside of a computer, logic gates connected to form circuits are housed in chips that are ultimately mounted on a printed circuit board called a "motherboard."
- SD memory card speed ratings are "classes" ranging from 1 to 10; the lower the class number the higher the memory write and read back speed.
- "Micro SD" physical is the same type of memory as in standard SD cards but is roughly the size of a fingernail and is used in cell phones and some portable music players.

- The integrated circuits inside of computer chips are manufactured one at a time on silicon wafers.
- In 1981 Intel's 8088 chip containing 29,000 transistors was at the heart of many small computers; by 1990, an Intel chip contained 1.2 million transistors-and today the number of transistors that can fit on a single chip is in the billions!
- Careers in IT are all focused on computer programming.

Background and advice about the learning exercises

Online learning exercises are based on formal research on learning.¹ Recent research indicates that trying something and being unsuccessful on it—making you think about and review the material—is one of the most beneficial techniques for learning and retaining information. My intent in forming the simple online exercises you find at the end of each unit in an online course is to help you learn and retain information you'll need to form your reflective work at the end of the term. Don't skip over the advice below, this advice can save you a lot of frustration!

Exercise facts:

- Each time you do an exercise the questions remain in the same order but the statements within questions are shuffled into a different sequence at random.
- At most, 3 of the 10 statements in any question are not true.
- At least one statement in each question is not true
- No untrue statement is based on trivia.
- **True statements contribute to the question score.**
- **Each untrue statement, if check-marked, subtracts some or all credit for a question. The amount subtracted varies in a way that is intended to foil guessing. Scoring is not linear!**
- If you checkmark all statements as being true trying to “game” the exercise you will receive no credit at all for the question!

Suggestions for exercise success...

1. **Don't put off doing the exercises!** You should start them in the first few days of the unit.
2. **Make your goal for each exercise a perfect score.**
3. **Within a unit do each question separately including reviewing readings and viewings and redoing it.** You can submit an exercise for grading after having made as few as one checkmark on one question; remember, these are NOT quizzes!
4. **You can redo each exercises any number of times during the term.**
5. **Your highest score for each exercise is automatically used for grading.**

One of the two links on the unit web page for Unit 1 take you to a short video that shows you how to establish a free account on the exercise system using the enrollment key supplied to you. The second link actually takes you to the exercise system.

¹ See *Unsuccessful Retrieval Attempts Enhance Subsequent Learning*, Nate Kornell et al., 2009 at http://sites.williams.edu/nk2/files/2011/08/Kornell.Hays_.Bjork_.2009.pdf