

Q.1 Enlist input devices and explain their roles.

The computer is a very versatile machine. It can easily process different types of data. To work with these data, we require different types of devices. These devices can help us enter data into the computer. These devices are called input and output devices. They mainly cover devices like mouse, keyboard, printer, speaker, joystick, etc which can be used with a computer. The devices that are used to display the information of the results are known as output devices. While the devices whose main function is to give instructions and data to the computer are called input devices. Today we are going to discuss these devices in detail. This is to help you have a basic idea about input and output devices. This will also help you with the questions on the computer aptitude in banking exams. We will start with the output devices.

The main function of the input device is to enter the data in the computer. The various examples of input data are a mouse, keyboard, light pen, etc.

Mouse

The mouse is found on every computer. It is an integral part of it. It is a pointing device. The main principle it works on is point and click. The mouse uses the trackball to give the motion to the pointer displayed on the screen. Usually, for the windows based programs, a mouse is used. Nowadays wireless mice are becoming more popular among people.

Keyboard

The keyboard is used to enter all the data into the computer. It directs the computer through instructions. Normally keyboard has 104 buttons called the keys. You can do various tasks through the keyboard. You can program, type, etc through keyboard only.

Scanner

The scanner is used to store photographs, picture, diagrams into the computer. It saves the image in the form of a file by reading it.

Touchscreen

Touchscreen monitors are becoming more and more popular. It requires putting the input to the computer through the touch by your finger, pen, stylus, etc. You can give any sort of information to the computer by touching it.

Light pen

A light pen is another pointing device that can be used in the computer. It is normally like a pen and is used to directly point at the objects seen on the screen. You can also draw various objects on the computer screen through a light pen.

Voice recognition achieved by VUI (Voice User Interface) is the ability for a programmed machine to respond to voice command. With the efficiency and convenience associated to the technology, it is fast becoming a way to help bridge the gap in professional task management and daily activities. Voice recognition is becoming more sophisticated and reliable, and as such, we can expect the technology to be implemented more, across

many different industries. At present, consumer trends are demonstrating rapid adoption of this new capability, with many companies striving to create optimal VUI experiences. Inside Telecom has comprised a few key advantages and drawbacks of this evolving technology.

Talking is faster than typing!

Voice commands are a far more efficient tool than typing a message. Advancements are being made in technology to make life easier and voice recognition is being built-in to more devices to help boost convenience and efficiency. Voice recognition software has improved and according to a study at the University of Stanford, it has become significantly faster and more accurate at producing text (through speech-based dictation on a mobile device) than we are at typing on its keyboard.

By integrating technology, such as those offered by voice solutions, businesses can streamline documentation processes, and alleviate the burden of typing and other admin tasks, enabling professionals to focus on more challenging and rewarding aspects of the job.

VUI has come a long way

VUI is constantly evolving and has come leaps and bounds from older software once produced for companies' customer service centers. We all remember encountering a rather frustrating automated service that did not have the advanced capability of understanding or responding to our voice activation (the first time around). Today, companies have implemented more developed voice recognition software that makes interaction with a robot feel more like a conversation with a human. And deep-machine learning means VUI software is able to understand more complex and diverse word responses. This shows that researchers are going that extra mile to improve VUI devices for a way that will fit into society and our broadening scope of needs.

Voice recognition boosts productivity levels

Voice recognition and speech activation is being developed for a whole myriad of reasons. The most essential role it may have is in the workplace where it can provide support and assistance to task-management duties. Amazon's Alexa can be used for managing and setting up conference calls as well as scheduling meetings and setting up reminders – this enables a company to streamline the process for everyone – which boosts productivity and efficiency levels.

This technology is making it possible to access big data instantly, allowing professionals to retrieve important information upon a voice command. As the technology develops, it will become commonplace to ask a question or request data for any specific case or project – taking less time than it would for us to manually search for information.

It can also streamline communication between people who speak different languages. The software has the capability of translating what is said in a foreign language into the native language for the recipient of the information to understand – which essentially helps one move beyond potential language barriers in daily business practices.

Drawbacks of voice and speech recognition

More devices are using VUI technology, which may present more challenges related to data privacy. If a device has this capability, the additional data can get tracked by the manufacturer. There have been concerns in the past that manufacturers would be capable of listening in on private conversations. This area of concern and questioning incentivized action from companies to work on offering better privacy controls for users. Not all words are accurately interpreted with voice recognition. It is far easier for a human to decode words and turn it into meaning, than it is for voice recognition software to do so. The software's limitation of understanding the contextual relation of words, may cause disruption to any given task assigned to the software along the way. It may encounter problems with slang words, acronyms or technical words/jargon.

Advantages of Speech Recognition for EHRs

1. Solves Inefficiencies and Reduces Wasted Time

In a Yale Medicine study, clinicians utilized a speech recognition solution. With this software, doctors could use their voice to complete and close encounters far more quickly than before. With the widespread adoption of speech recognition systems in recent years, there have been many reports of physicians improving efficiencies and saving time.

A 2018 report by KLAS showed that overall, productivity increased due to speech recognition adoption. Clinicians were able to spend less time completing reports while using speech recognition tools allowing them to focus more on their patients.

2. Clinics and Hospitals Can Save Money

Many organizations find that speech recognition systems can help them reduce costs. With speech recognition, it may be possible to reduce overtime hours for transcriptionists and/or stop outsourcing clinician dictation to outside firms. It is more efficient for everyone, saving money in the process.

3. Clinician Satisfaction

When a clinician is able to complete their work in a shorter amount of time, they'll feel more satisfied with their job overall. They will spend less time sitting at their desk completing documentation while spending more time with their patients. They can also focus on their life outside of work because they won't be finishing up documentation during evenings or weekends.

According to a 2018 HealthDay News report, EHRs can be made more efficient and user-friendly by adding in speech recognition features:

“EHR inefficiencies were making physicians unhappy and adding extra work hours, including taking work home at night and on weekends. A series of discussions with leadership led to the implementation of information technology (IT) solutions that would address physician burnout and improve the user experience with EHRs... Yale Medicine implemented speech recognition for physicians. Speech-recognition software has reduced the time it takes clinicians to complete and close encounters by 50 percent. The average time to close an encounter is down by eight hours a week”

This Yale Medicine study showed that speech recognition solutions were able to significantly shave hours of time off physicians' workweek, thus enabling them to spend more time doing what they want to be doing instead of struggling with documentation.

Q.2 Explain Arithmetic Logic Unit (ALU) and discuss its functions.

An arithmetic logic unit (ALU) is a digital circuit used to perform arithmetic and logic operations. It represents the fundamental building block of the central processing unit (CPU) of a computer. Modern CPUs contain very powerful and complex ALUs. In addition to ALUs, modern CPUs contain a control unit (CU).

Most of the operations of a CPU are performed by one or more ALUs, which load data from input registers. A register is a small amount of storage available as part of a CPU. The control unit tells the ALU what operation to perform on that data and the ALU stores the result in an output register. The control unit moves the data between these registers, the ALU, and memory.

Arithmetic Logic Unit (ALU): A sub unit within a computer's central processing unit. ALU full form is **Arithmetic Logic Unit**, takes the data from Memory registers; **ALU** contains the logical circuit to perform mathematical operations like subtraction, addition, multiplication, division, logical operations and logical shifts on the values held in the processors registers or its accumulator.

It is the size of the word that the **ALU** can handle which, more than any other measure, determines the word-size of a processor: that is, a 32-bit processor is one with a 32-bit ALU.

After processing the instructions the result will store in Accumulator. Control unit generates control signals to ALU to perform specific operations. The accumulator is used as by default register for storing data. It is 16-bit register.

The simplest sort of ALU performs only addition, Boolean logic (including the NOT or complement operation) and shifts a word one bit to the right or left, all other arithmetic operations being synthesized from sequences of these primitive operations. For example, subtraction is performed as complement-add multiplication by a power of two by shifting, division by repeated subtraction. However, there is an increasing tendency in modern processors to implement extra arithmetic functions in hardware, such as dedicated multiplier or divider units.

The ALU might once have been considered the very core of the computer in the sense that it alone actually performed calculations. However, in modern SUPER SCALAR processor architectures this is no longer true, as there are typically several different ALUs in each of several separate integer and floating-point units. An ALU may be required to perform not only those calculations required by a user program but also many internal calculations required by the processor itself, for example to derive addresses for instructions that employ different ADDRESSING MODES, say by adding an offset to a base address. Once again, however, in modern architectures there is a tendency to distribute this work into a separate load/store unit.

The three fundamental attributes of an ALU are its operands and results, functional organization, and algorithms.

Operands and Results

The operands and results of the ALU are machine words of two kinds: arithmetic words, which represent numerical values in digital form, and logic words, which represent arbitrary sets of digitally encoded symbols. Arithmetic words consist of digit vectors (strings of digits).

Operator: Operator is arithmetic or logical operation that is performed on the operand given in instructions.

Flag: ALU uses many types of the flag during processing instructions. All these bits are stored in status or flag registers.

Functional Organization of an ALU

A typical ALU consists of three types of functional parts: storage registers, operations logic, and sequencing logic.

Arithmetic Logical Unit (ALU) Architecture

ALU is formed through the combinational circuit. The combinational circuit used logical gates like AND, OR, NOT, XOR for their construction. The combinational circuit does not have any memory element to store a previous data bit. Adders are the main part of the arithmetic logic unit to perform addition, subtraction by 2's complement.

Control unit generates the selection signals for selecting the function performed by ALU.

Registers : Registers are a very important component in ALU to store instruction, intermediate data, output, and input.

Q.3 Identify ways in which display devices differ.

As we are familiar that we can interact with the computer system through the Display Devices. These display devices enable us to communicate with the computer through the graphical interface. There are different types of Display Devices which are used to interact with the computer system or any other device. Some of them are following

- **Monitor**
- **Flat panel Display (FPD)**
- **Cathod Ray Tube (CRT)**
- **Projector**
- **Touchscreen**

Monitor

This is mostly used as an output display device. There are further two types of Monitors available which are discussed following

1. Flat Panel Display

A flat-panel display (FPD) is very thin, lightweight, and very little power device. A flat panel display has common types like LCD (Liquid Crystal Display), LED (Light Emitting Diode) and OLED (Organic LED). LCD uses a liquid crystal molecules for displaying, LED uses light emitting diodes for display while OLED uses a special organic compound for display.

2. CRTs

A CRT monitor is heavier than FPD because it contains a large cathode ray tube. It uses electron guns to activate phosphors behind the screen, causing each pixel on the monitor to generate red, green, or blue.

Projector

Projectors shoot an image out the front and onto a screen or some panel. It provides greater display as compared to monitors and they are mostly used for presentations or meetings. The qualities that matter most are brightness of projector and its throw (image size at a given distance from the screen).

Touchscreens

A touchscreen is both an input device and an output device. It has a touch-sensitive surface that we use to interact with the operating system. The touch-sensitive part of the screen is called the digitizer which contains sensors that record our touch. There are basically two types of touch-sensitive screens, one is resistive screen which consists of two thin, flexible sheets of plastic, with a gap between them while the other is capacitive screen which uses the electrical properties of the human body to alter the capacitance of an electrostatic field on the screen.

Display Ports & Connectors

There are different ports and connectors which we use for displaying different graphics like images, videos etc. Some of them are discussed bellow.

1. DVI (Digital Visual Interface)

This connector carry only the video signals in three ways. One is DVI-D (digital), other is DVI-A (analog), and the third is DVI-I (integrates digital and analog).

2. HDMI (High Definition Multimedia Interface)

HDMI can carry both video and audio signals. This is mostly used for theater displays as well as in monitors. This connector has its own special kind of port on the system.

3. S-Video

It stands for Separate video. It can also carry both video and audio signals but its resolution is low as compared to the HDMI interface. It has 4-pins.

4. Component (RGB) Video

This uses three connectors of three colors Red, Green and Blue. These are mostly used in Televisions and other displays. These are not suitable for PC display. These carry only video signals.

5. Composite Video

It is simply yellow color connector and its yellow color port in the RCA cables. It is used only for video signals. There are others RCA connectors (Red and white) which are used with the composite video connector in order to carry audio signals. Mostly used in the Televisions and Satellite Receivers.

6. VGA (Video Graphics Array)

These are mostly used in the PCs and Projector displays. It carries analogue signals for displaying. It has 15 pins (5 pins in each 3 rows). It has its own special types of port on the system.

7. Thunderbolts

These is mostly used in the Macintosh PCs and many small devices. These can carry both video and audio signals as well as data from one device to another. These connectors have their own ports with a special symbol on them.

8. Display Ports

These port work same as Thunderbolts and its shape is almost same as USB port but with slight changes on one corner. These are used for displaying after the thunderbolts.

9. USB ports

As discussed in the previous blog, it is one of the mostly used technology for transferring data and visual signals in today's era. It has different types and different generations.

Q.4 what need may be met by each of the following programming language, BASIC, COBOL, C PASCAL.

C

The C programming language was developed in 1972 by Dennis Ritchie and Brian Kernighan at the AT&T Corporation for programming computer operating systems. Its capacity to structure data and programs through the composition of smaller units is comparable to that of ALGOL. It uses a compact notation and provides the programmer with the ability to operate with the addresses of data as well as with their values. This ability is important in systems programming, and C shares with assembly language the power to exploit all the features of a computer's internal architecture. C, along with its descendant C++, remains one of the most common languages.

COBOL

COBOL (common business oriented language) has been heavily used by businesses since its inception in 1959. A committee of computer manufacturers and users and U.S. government organizations established CODASYL (Committee on Data Systems and Languages) to develop and oversee the language standard in order to ensure its portability across diverse systems.

COBOL uses an English-like notation—novel when introduced. Business computations organize and manipulate large quantities of data, and COBOL introduced the record data structure for such tasks. A record clusters heterogeneous data—such as a name, an ID number, an age, and an address—into a single unit. This contrasts with scientific languages, in which homogeneous arrays of numbers are common. Records are an important example of “chunking” data into a single object, and they appear in nearly all modern languages.

BASIC

BASIC (beginner's all-purpose symbolic instruction code) was designed at Dartmouth College in the mid-1960s by John Kemeny and Thomas Kurtz. It was intended to be easy to learn by novices, particularly non-computer science majors, and to run well on a time-sharing computer with many users. It had simple data structures and

notation and it was interpreted: a BASIC program was translated line-by-line and executed as it was translated, which made it easy to locate programming errors.

Its small size and simplicity also made BASIC a popular language for early personal computers. Its recent forms have adopted many of the data and control structures of other contemporary languages, which makes it more powerful but less convenient for beginners.

Pascal

About 1970 Niklaus Wirth of Switzerland designed Pascal to teach structured programming, which emphasized the orderly use of conditional and loop control structures without GOTO statements. Although Pascal resembled ALGOL in notation, it provided the ability to define data types with which to organize complex information, a feature beyond the capabilities of ALGOL as well as FORTRAN and COBOL. User-defined data types allowed the programmer to introduce names for complex data, which the language translator could then check for correct usage before running a program.

During the late 1970s and '80s, Pascal was one of the most widely used languages for programming instruction. It was available on nearly all computers, and, because of its familiarity, clarity, and security, it was used for production software as well as for education.

Q.5 what is drill and practiced? Why drill and practice is so popular.

Several goals can be attributed to drill and practice exercises. They can be used to build confidence as more answers are correctly provided. They also help to reinforce important materials. Learners are also provided and opportunity to practice critical skills and knowledge sets. Sample objectives are shown next.

During and after performing the activity, students will...

- increase skill at performing the given task...
- increase speed at performing the given task...
- internalize the given information until it is an automatic assumption...

...as determined by successfully attending to 80% of rubric items.

Prerequisites:

In general, there are no prerequisites for drill and practice. It is commonly used as a core set activity such as learning an alphabet. Prerequisites may exist if more advanced knowledge sets are to be practiced. For example, you would not use drill and practice in multiplication if the student does not already know addition.

Materials and Resources:

The instructor must provide instruction in what is to be practiced. Depending on the curriculum, worksheets may be produced on which the students work.

Guiding Questions for this Lesson:

There is not usually a guiding question in drill and practice exercises, perhaps adding to the opposition of its use in more advanced thinking skills. It is basically a technique used in process and declarative knowledge building activities.

Lesson Outline and Procedure:

Before beginning a drill and practice exercise, the students must be informed and taught the underlying principles. Once the principle has been demonstrated or instructed, the students are given an activity, procedure, or worksheet to complete. A set time limit is usually employed. Assessment should quickly follow performance with opportunities for additional reinforcement and skill building. Effective use of drill and practice will depend on linking the activity to the actual skill that the instructor intends to develop.

Drill and practice activities can also be provided to students to do on their own time and at their own pace, with assessment provided after they have been completed. When appropriate, computer-based assessment can be used to provide immediate feedback without instructor overseeing the activity, such as in many mathematics drills.

Teaching Strategies:

- Kinesthetic drills should be in a real life situation.
- Avoid criticisms of student ability. It may be that the prerequisites have not been met and the activity is not appropriate for the given student.
- Finish every drill.
- Studies have shown that children learn better individually rather than in pairs when performing drill and practice exercises.

Accommodations:

What accommodations may be needed for students with disabilities or other special needs? Clearly, some physical disabilities will prohibit some kinesthetic activities from being performed. Time may also become a factor for some students, such as those with dyslexia, in performing some tasks since speed is often part of the assessment in drill and practice exercises.

Timeline:

Drill and practice exercises are short term activities that are usually completed in under 10 minutes. There should be follow-up reinforcement at later times.

Ideas for Lesson Evaluation and Teacher Reflection:

How did the students like the lesson? End of semester evaluations should ask about the usefulness and learning accomplished through such activities.

How was student learning verified? Participation can be assessed in discussion sessions. In general, student work is assessed by the number of correct responses or actions in a given time frame with process providing partial credit towards the final grade.