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Computer Science

# Fundamentals Classification of Computers



Suresh Khanal

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## Abstract

Computers are grouped into different classes and each computer can be identified to belong in one of such class. This eBook is composed to help candidates of computer jobs exams. Though most of these exams are based on objective questions (more specifically multiple choice questions), finding correct answer without the solid knowledge of subject matter is almost impossible. Thus enable you to acquire most essential knowledge of Classification of Computers, following text is presented. I will consider my efforts getting success if you find this text useful for your preparation.

*Keywords: classification of computers, types of computers, size, brand, model, application of computers, mainframe, mini computers, microcomputers, XT, AT & PS/2 Computers, Apple, IBM and Compatible computers.*

~Suresh Khanal

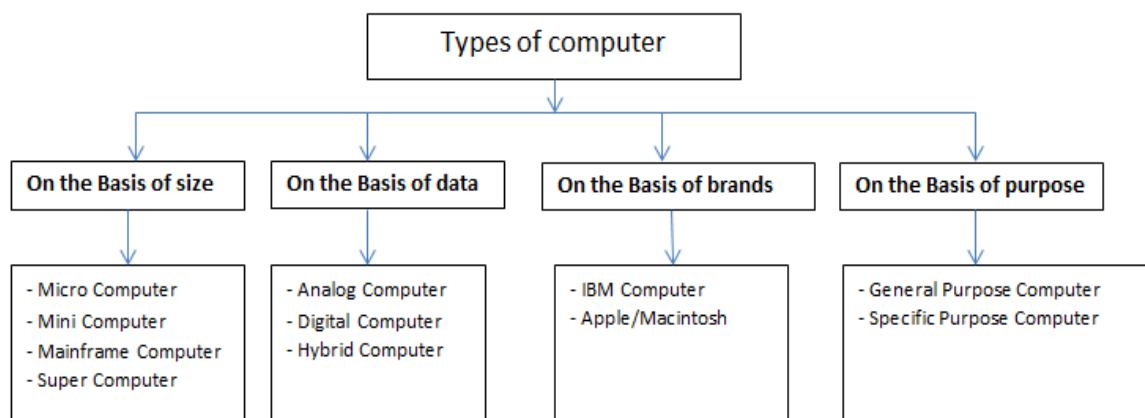
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# 1 CLASSIFICATION OF COMPUTERS

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In this eBook, we will look at classification of computers – the different types of computers based on various aspects.

Since the first computer, there are different types of computers. Some are designed to perform specific task while some for general purpose – do everything a program can make it to do. Some computers work with continuous signals of the physical quantities such as pressure, temperature, speed, current etc. as input and some with discrete data or the digital signals. Some computers are really huge in size while others are as tiny that fit in our pockets and palm. There are computers from different companies that work total differently and some work similar to others. So, in this topic we'll try to identify the classes on which each computer can be grouped into – the classification of computers.





## 1.1 CLASSIFICATION OF COMPUTERS BASED ON APPLICATION

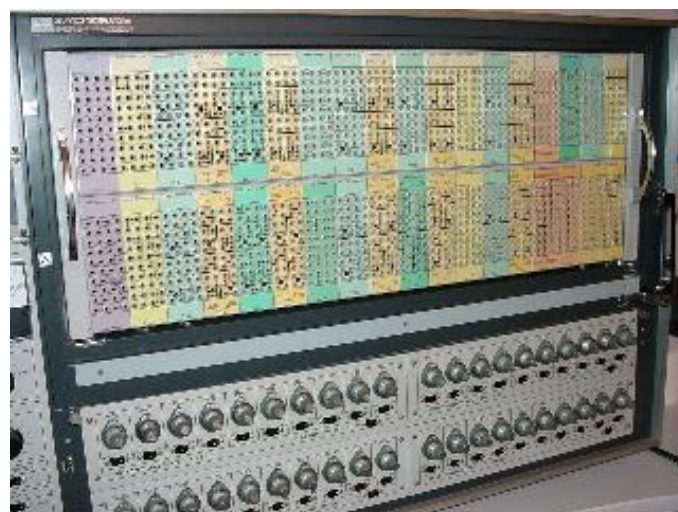
We can identify three different classes when we look upon how a computer works or what they are applied for, namely, Analog, Digital and Hybrid computers.

### 1.1.1 Analog Computer

An analog computer is a form of computer that uses the continuously-changeable aspects of physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved. These computers are used in Hospitals, Air-crafts and so on.

An analog computer can be mechanical analog computer or electronic analog computer. (There can be a confusion that electronic computers are digital but note that there are electronic analog computers too!)

Mechanical analog computers have existed for thousands of years, with the oldest known example being the **Antikythera**. This is a Greek machine, thought to have been made around 100 BC, designed for calculating astronomical positions. A more recent and common mechanical analog computer is the slide rule.

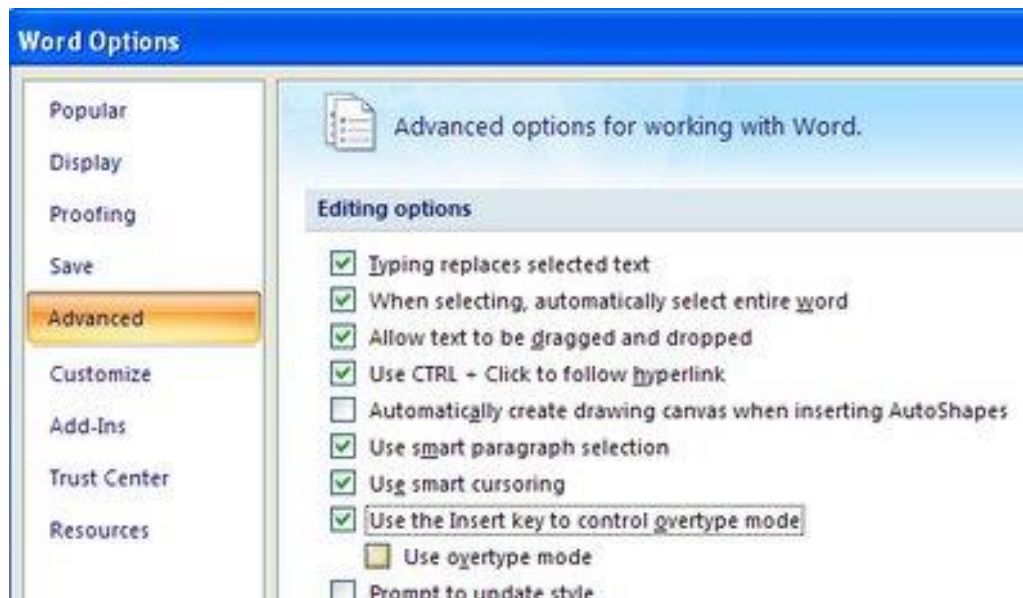


**THE HITACHI 240 ANALOG COMPUTER**

### 1.1.2 Digital Computer

**Digital computers** are the most common class of computers for us because we are using them every day. Digital Computers can be defined as a computer that performs calculations and logical operations with quantities represented as digits, usually in the binary number system.

In digital computers, mathematical expressions are represented as binary digits (0 and 1) and all operations are done using these digits at a very high rate. It means that the computer operates on electrical inputs that have only two states, ON and OFF. These computers are widely used in commercial and control systems. Nowadays when we use the word computer, we mostly refer to a digital computer.



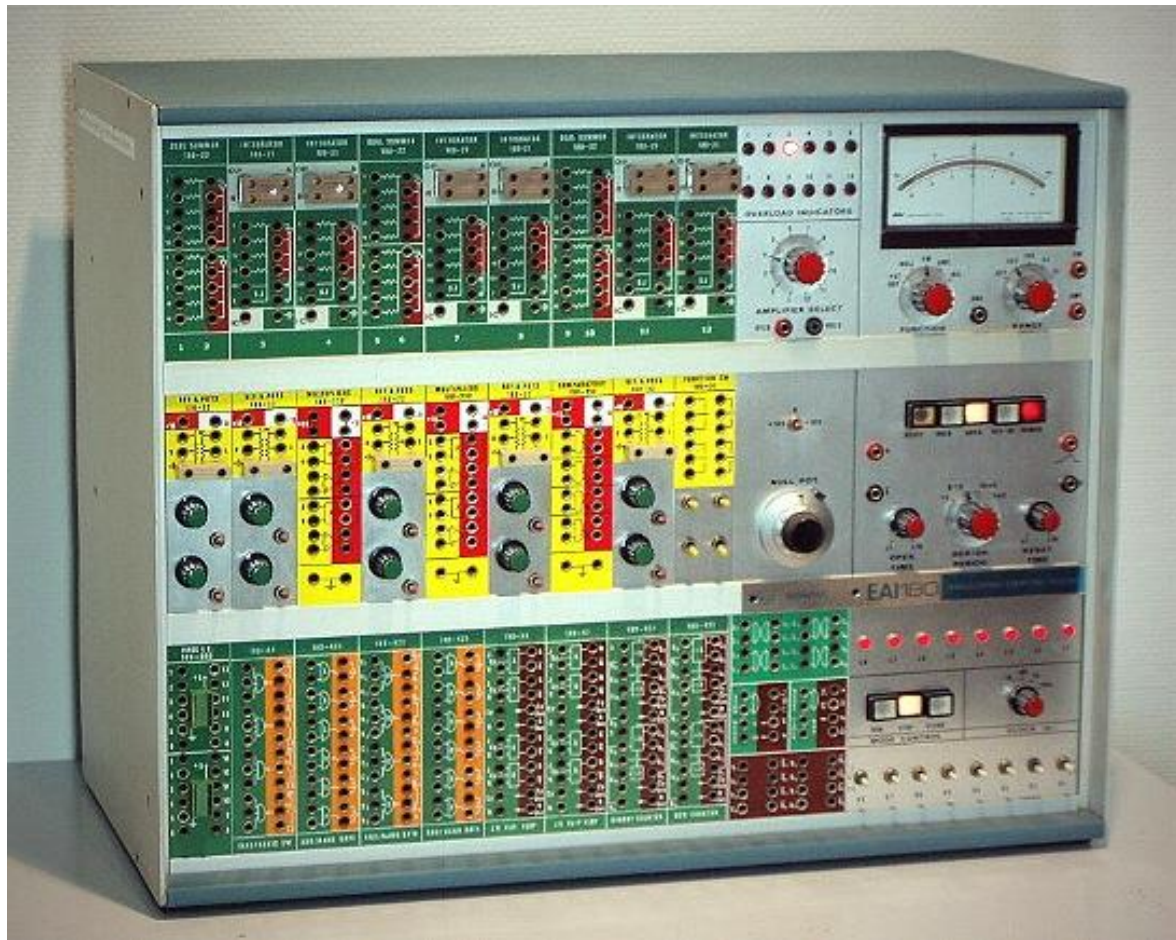
### DIGITAL COMPUTER

#### 1.1.3 Hybrid Computers

Analog computers worked purely measuring the physical quantities whereas a digital computer counts and manipulates the numbers to produce results. There is another class of computers that can take benefit of features of both these two classes, so, known as hybrid computers.

Hybrid computers are computers with combined features of both digital and analog type. Desirable features of analog and digital machines can be combined to create a Hybrid Computer. This type of computer operates by counting as well as by measuring. In other words, the output can be either in the form of numbers or required units of measurement, e.g., an analog device measures patient's heart beat (ECG). These measures will be converted into digital form and a digital device checks for any abnormality. Further, we can also input digital data like your marks and get digital results like the result of your class. Another example is a Modem. (Which converts the digital signals into analog, carry it along the line and at the receiving end again changes it back into digital signal).

If you are interested about the differences in analog, digital and hybrid computers, you are encouraged to visit [http://www.answerbag.com/q\\_view/1602745](http://www.answerbag.com/q_view/1602745).



**EAI 180 HYBRID COMPUTER**

## 1.2 CLASSIFICATION OF COMPUTERS BASED ON SIZE

We've already seen how large the computers were and these days we are using very small computers, some even embedded in wrist watch. So, another interesting aspect to classify computers is based on size. If we look at the computers from this perspective, we can group them into three major classes – Mainframe, Mini and Microcomputers.

### 1.2.1 Mainframe Computers

These are very huge computers. It is interesting how the word 'mainframe' came into use. In fact, because the different units of computer were installed in a frame, it started to be called a computer in main frame and today classes of computers are called Mainframe computers.

Mainframe computers are very powerful computers with large memory and processing capabilities. It can support hundreds of users simultaneously.





**MAINFRAME COMPUTER**

### 1.2.2 Mini Computers

**Mini computers** are medium sized computers – much larger than the personal computers we are using and smaller compared to the mainframe computers. These computers can support multiple users simultaneously and is less powerful than mainframe computers.

A Minicomputer was typically a standalone device that was ideal for use by small and medium sized businesses who needed more power and memory than could be obtained with microcomputers, but did not have a need for the resources provided by mainframes. More recently, a minicomputer is thought of in terms of being a server that is part of a larger network.



**DEC PDP 12**

Photo by [Barnaby](#)



### 1.2.3 Micro Computers

Those computers that use microprocessor as their central processing unit and are the smallest of the types are the **microcomputers**. Microcomputers are often called personal computers (PCs) because they are intended to be used by a single person at a time. While mainframe and mini computers can support multiple users simultaneously, it can support only one user at a time.

Micro computers can further be classified into desktop computers (that can fit within the top of a desk), laptops (portable computers that can be operated on your lap) and palmtops (hand held computers).



#### MICRO COMPUTERS

### 1.2.4 Super Computers

There is another class of computers too! But I always feel it uncomfortable to list it as a class based on size. Oh! It does not fit anywhere? But there are a group of powerful computers known as Super Computers.

**Super Computers** are the fastest type of computer and can be the largest too! Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations. For example, weather forecasting requires a supercomputer. Other uses of supercomputers include animated graphics, fluid dynamic calculations, nuclear energy research, and petroleum exploration.

The chief difference between a supercomputer and a mainframe is that a supercomputer channels all its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently.



**SUPER COMPUTER - CRAY I**

### **1.3 CLASSIFICATION OF COMPUTERS BASED ON BRAND**

Brands are specific names that companies use to identify their product against others in the market. There are many companies involved in computer manufacturing. However there are two classes of computers very different in principle itself – the IBM and the Macintosh. There are many other companies that follow the principle of IBM and are called IBM Compatible computers.

#### **1.3.1 IBM PCs**

These are the computers developed by IBM Company. After Thomas John Watson became president of Computing Tabulating Recording in 1914, he renamed it in 1924 as International Business Machines Corporation (IBM). In 1975 IBM introduced their first personal computer (PC) which was called the Model 5100. Later on IBM teamed up with Microsoft to create an operating system because their software division was not able to meet a deadline. They also teamed up with Intel to supply its chips for the first IBM personal computer. When the personal computer hit the market it was a major hit and IBM gained a strong power in electronic computers.

What identifies IBM computers is because of the UPU design. IBM computers use CISC (Complex Instruction Set Computing) CPUs. It uses the Intel chips for its PCs and relied to Microsoft for operating system.



**IBM PC 5150**

### **1.3.2 Apple Macintosh Computers**

Apple Company was founded by Steve Jobs and Steve Wozniak in 1976. For about \$700 someone could buy a computer that they put together, which was called the Apple I. In 1977 the Apple II was introduced. Apple was trying to appeal more to the business world so they designed the Lisa computer that was a prototype for the Macintosh and it cost around \$10,000. It featured a 'never before seen' graphical interface and the mouse. In 1984, they launched the Macintosh.

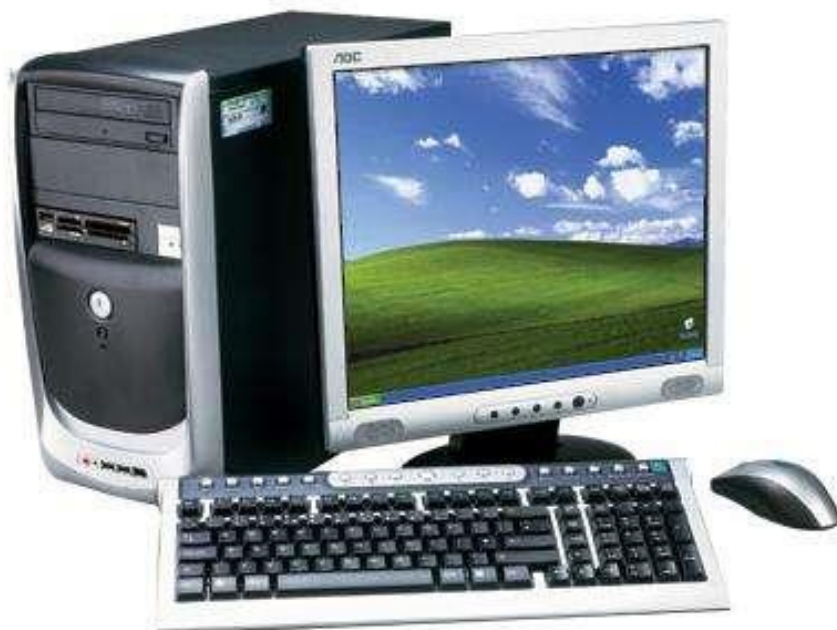
IBM used Motorola chips and created a RISC (Reduced Instruction Set Computing) CPU that could run faster than the CISC model of the same MHz rating, so a RISC chip with a MHz rating of 100 could run just as fast as a CISC chip with MHz rating of 133.



**APPLE MACINTOSH**

### **1.3.3 Compatible Computers**

Phoenix Technologies went through published documentation of IBM PC to figure out the internal operating system (BIOS) in the IBM. In turn, they designed a BIOS of their own which could be used with IBM computers. Many manufacturers jumped in and started making their own IBM Compatible computers. So, there is a class of computers that work in the same principle as that IBM PCs but are developed by other companies. These computers are generally known as Compatible Computers.



**IBM COMPATIBLE PCs**



## 1.4 CLASSIFICATION OF COMPUTERS BASED ON MODEL

We can still classify computers based on another aspect – model. There are three different models of computers already available – XT computers, AT computers and PS/2 computers.

### 1.4.1 Extended Technology or XT

The extended technology computers used 8006, 8008, 8086, 8088 processors (These are the names of Microprocessors). The period of these computers was from 1975 to 1982. These processors had 4.77 MHz clock speed (these days there are Gigahertz computers). The processors were all of 8-bit. These computers are outdated now by two reasons: first, they do not support the latest software and the second that they had low processing power as well as low storage capacity.



**IBM PC XT (IBM 5160)**

### 1.4.2 Advanced Technology or AT

With the advent of 80286 microprocessors in 1982, Advanced Technology computers were introduced. The processors were of 8-bit and 16-bit. The computers using processors like 80286, 80386, and 80486 are the examples. Advanced Technology computers' period is from 1982 to 1995. With the features of higher speed and larger memory than the XT computers, they support latest versions of available software.

AT computers may have 80286 SX or 80387 DX, 80486 SX, 80486 DX or even Pentium (80586) processors. The AT computers support Co-processor that enhances the processing speed and capability of the main processor to perform large and computations within a short period.



#### 1.4.2.1 IBM PC AT

#### 1.4.3 Personal System or PS/2

With the advancement of Processors having high clock speed as well as high storage capacity, IBM developed the second generation of personal computers in early 1990s, which used new refined architecture making the computers faster and more powerful than AT computers. The PS/2 processors used VLSI (Very Large Scale Integration) for chip fabrication and their clock speed range from 85 MHz to 1GHz. Generally, PS/2 Computers use 3.5 inch floppy disks and OS/2 operating System. PS/2 computers are widely used in general purpose computation such as word processing, Database Arrangement, Controlling accounts etc.



PS/2 PC

## 2 POINTS TO REMEMBER

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- Computers can be classified into different groups according to different categories such as principle or application, size and brand.
- Analog, Digital and Hybrid are the three classes of computers **based on the principle of work**.
- Super, Mainframe, Mini and Micro are the different classes of computers **based on the size**.
- Apple/Macintosh, IBM PCs, Compatibles are the classes of computers **based on the brand**.
- **Analog computer** works by processing the continuous analog signals such as heat, pressure, speed etc.
- **Digital computer** works by processing the discrete data.
- Digital computers can be divided into two classes – **general purpose and special purpose**.
- **Hybrid computers** can accept analog signals or digital data to process and produce results.
- **Super computer** is the largest and the most powerful computer. Its **speed is generally measured in FLOPS** (Floating Point Operations Per Seconds)
- **Mainframe computer** is often referred as "**big iron**". Supercomputer can perform a task in really faster speed but mainframe computer can support largest number of tasks in a time instance.
- **Minicomputer** is medium sized computer and thus suitable for large organizations, universities and research institutes.
- **Microcomputers** are the smallest computers. They range from desktop PCs to laptops, notebooks, palmtops, wearable and pocket computers.
- Computers manufactured by IBM Company are known as **IBM PCs**. Apple Company produced **Apple** and **Macintosh** computers. All other manufacturers who produced computers based on IBM PC principle are known as **compatibles**.

### 3 MULTIPLE CHOICE QUESTIONS

This PDF file is complementary study material of [mcqsets.com](http://mcqsets.com) & [FundamentalsMCQ.com](http://FundamentalsMCQ.com). Please visit [mcqsets.com](http://mcqsets.com) for more MCQ collections. You are encouraged to send me the MCQ questions through <http://mcqsets.com/contact/>

1. **Special purpose computers are better in performance because**
  - a. They have more memory
  - b. A set of instructions is built into the machine
  - c. They are equipped with faster processor
  - d. None of above
2. **..... use continuous physical phenomena to model the problem being solved**
  - a. Analog computers
  - b. Digital computers
  - c. Hybrid computers
  - d. None of above
3. **..... performs calculations and logical operations with quantities represented as digits, usually in the binary number system**
  - a. Analog computers
  - b. Digital computers
  - c. Hybrid computers
  - d. None of above
4. **A ..... system setup offers a cost effective method of performing complex simulations**
  - a. Analog computer
  - b. Digital computer
  - c. Hybrid computer
  - d. None of above
5. **Very expensive computers that are employed for specialized applications that require immense amounts of mathematical calculations**
  - a. super computers
  - b. mainframe computers
  - c. mini computers
  - d. hybrid computers
6. **..... are applied for tasks such as weather forecasting, animated graphics, fluid dynamic calculations, nuclear energy research and so on**
  - a. super computers
  - b. mainframe computers
  - c. mini computers
  - d. hybrid computers
7. **The chief difference between a supercomputer and a mainframe is**
  - a. Super computers are much larger in size compared to mainframe computers
  - b. Super computers have many processors parallel in action whereas mainframe have only one
  - c. Supercomputer channels all its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently
  - d. All of above
8. **A computer capable of supporting hundreds, or even thousands, of users simultaneously is.**
  - a. Super computer
  - b. Mainframe computer
  - c. Mini computer
  - d. Micro computer
9. **Mainframes are more powerful than supercomputers because**
  - a. they support more simultaneous programs.
  - b. they can execute a single program faster
  - c. they consume less electricity to perform more tasks
  - d. All of above.



- 10. A multiprocessing system capable of supporting from 4 to about 200 users simultaneously.**
- Super computers
  - Mainframe computers
  - Mini computers
  - Micro computers
- 11. Desktops, Laptops & Palmtops are the example of \_\_\_\_\_ computers**
- Super computers
  - Mainframe computers
  - Mini computers
  - Micro computers
- 12. A hand-sized computer that has no keyboard but the screen serves both as an input and output device**
- Desktop computers
  - Laptop computers
  - Palmtop computers
  - Notebook computers
- 13. Advantage of analog computers over digital computers is?**
- Speed
  - Accuracy
  - Versatility
  - All of above
- 14. HRS-100 is an example of?**
- Analog computers
  - Digital computers
  - Hybrid computers
  - None of above
- 15. Antikythera is an example of?**
- Mechanical analogue computer
  - Electronic analogue computer
  - Mechanical digital computer
  - Electronic digital computer
- 16. When was the world's first laptop introduced in market and by which company?**
- Epson, 1981
  - IBM, 1950
  - Microsoft, 1988
  - Compaq, 1965
- 17. Which of the following uses RISC CPU?**
- IBM PCs
  - IBM Compatibes
  - Apple Macintosh
  - None of above
- 18. Which was the world first minicomputer?**
- PDP-I
  - IBM system/36
  - PDP-II
  - Vax 11/780
- 19. The computers that use 8080 or 8086 microprocessors are .....**
- XT computers
  - AT computers
  - PS/2 computers
  - None of above
- 20. .... computers are often referred as big iron**
- Super computers
  - Mainframe computers
  - Mini computers
  - Micro computers

This is my earnest effort to assist candidates of computer jobs exams. I offer my assistance through MCQ Sets (<http://mcqsets.com>), Fundamentals MCQ (<http://fundamenatismcq.com>) and you're welcome to discuss in <http://icttrends.com>

Enjoy preparation!

## 4 CORRECT ANSWERS

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1-B	2-A	3-B	4-C	5-A	6-A	7-C	8-B	9-A	10-C
11-D	12-C	13-A	14-C	15-A	16-A	17-C	18-A	19-A	20-B

## 5 CONTACT

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