



Faculty of engineering - Shoubra
Benha University

Research Article / Research Project / Literature Review

in fulfillment of the requirements of

Department	Engineering Mathematics and Physics
Division	-----
Academic Year	2019-2020 Preparatory
Course name	Computer
Course code	ECE001

Title: -

Computer Architecture

By:

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Dr. Abdelhamid Attaby	



Research objectives

- Computer
- Input and Output Devices
- Motherboard and CPU
- Port
- Machine Cycle
- Memory Vs. Storage
- Types Of Computers
- Ergonomics

Website Link: <https://mohamed-abodouh.github.io/ece001/>

GitHub Pages Link: <https://github.com/Mohamed-Abodouh/ece001>

Introduction

The computer lies at the heart of computing. Without it most of the computing disciplines today would be a branch of theoretical mathematics. A professional in any field of computing should not regard the computer as just a black box that executes programs by magic. We should acquire some understanding and appreciation of a computer system's functional components, their characteristics, their performance, and their interactions. We need to understand computer architecture in order to make best use of the software tools and computer languages we use to create programs.



A Short Brief about the Website

The Website contains a Main Page and Nine Pages attached to it. The Main Page consists of Nine Elements. When we press on any Element, The Website goes to another page which views this Element and after reading all the Element Information, we will find a button called "Go To Main Page". When we press on it, the Website returns back to Main Page.

The Website is talking about Computer Architecture and its Elements such as: Computer, Input and Output Devices, Motherboard and CPU, Port, Machine Cycle, Memory Vs. Storage, Types of Computers, Ergonomics and finally the References used to collect Information about this Article.

We will find the References, the last Element in the Main Page, when we press on it, the Main Page goes to another Page which views the References.

The Website contains 35 Pictures for these Elements and many Lists and Tables with all their Types.

The website contains different shapes of arrows used to point to Information.

Each Element contains the most important Information about it.

Computer Architecture

Objectives

Main page.

- Computer
- Input and Output Devices
- Motherboard and CPU
- Port
- Machine Cycle
- Memory Vs. Storage
- Types Of Computers
- Ergonomics

When we press on the first element (computer).

Computer Architecture

Computer

- ⇒ Computers are Data Processing Devices.
- ⇒ Programmable, Electronic Device that accepts Data, performs Operations, presents the Results, and can store the Data or Results.
- ⇒ Input Entering Data into the Computer.
- ⇒ Processing Performing Operations on the Data.
- ⇒ Output Presenting the Results.
- ⇒ Storage Saving Data, Programs, or Output for Future Use.

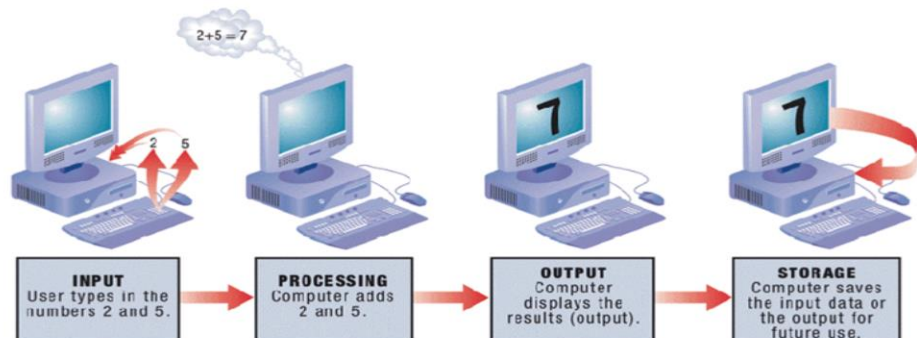


FIGURE 1-6



After seeing the whole data press on (Go To Main Page).

Name	Abbreviation	Number Of Bytes
Byte	B	1 Byte
Kilobyte	KB	1,024 Bytes (2^{10} Bytes) $\approx 10^3$
Megabyte	MB	1,048,576 Bytes (2^{20} Bytes) $\approx 10^6$
Gigabyte	GB	1,073,741,824 Bytes (2^{30} Bytes) $\approx 10^9$
Terabyte	TB	1,099,511,627,776 Bytes (2^{40} Bytes) $\approx 10^{12}$

The Language of Computers

- 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 a set of computer programs.
 - Application software.
 - System software.
 - Operating system (OS).

[Go To Main Page](#)

Main Page appears again.

Computer Architecture

Objectives

- Computer
- Input and Output Devices
- Motherboard and CPU
- Port
- Machine Cycle
- Memory Vs. Storage
- Types Of Computers
- Ergonomics
- Defences



You can choose another Element such as (Types Of Computers).

Types of Computers

Two basic designs of computers:

1. Portable

1. Laptop computers:

↳ A portable computer that has a keyboard, monitor, and other devices integrated into a single compact case.

2. Netbooks:

↳ A small, lightweight laptop computer that is generally 7 to 10 inches wide and has a longer battery life than a laptop

3. Tablet:

↳ A portable computer integrated into a flat multitouch-sensitive screen. It uses an onscreen virtual keyboard.

4. Ultrabooks:

↳ A full-featured but lightweight laptop computer.

After seeing the whole data press on (Go To Main Page).

1. Supercomputer:

↳ Performs complex calculations extremely rapidly.

↳ Designed to handle many programs running at the same time.

2. Mainframe:

↳ Supports many users simultaneously.

↳ Designed to execute a few programs as quickly as possible.

3. Desktop computers:

↳ A large, expensive computer that Separate case plus peripheral devices.

↳ Used in businesses that manage large amounts of data.

4. Embedded:

↳ Specially designed computer chip that resides in another device.

↳ Self-contained computer devices performing dedicated functions.

[Go To Main Page](#)



Main Page appears again.

Computer Architecture

Objectives

- Computer
- Input and Output Devices
- Motherboard and CPU
- Port
- Machine Cycle
- Memory Vs. Storage
- Types Of Computers
- Ergonomics
- References

You can choose another Element such as (References).

Computer Architecture

References

- Doctors' Lectures.
- Stallings, W. . Computer organization and architecture: designing for performance (Tenth Edition). Pearson Education India.
- Null, L., & Lobur, J. . The essentials of computer organization and architecture. Jones & Bartlett Publishers.
- John L. Hennessy and David A. Patterson. Computer Architecture: A Quantitative Approach (Fifth Edition ed.). Morgan Kaufmann Publishers.
- Laplante, Phillip A. (2001). Dictionary of Computer Science, Engineering, and Technology.
- Abd-El-Barr, M., & El-Rewini, H. (2005). Fundamentals of computer organization and architecture (Vol. 38). John Wiley & Sons.
- Sinha, P. K., & Sinha, P. (2010). Computer fundamentals. BPB publications.

[Go To Main Page](#)



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Academic year 2019-2020



```
<?index.html> ...
1  <!DOCTYPE html>
2  <html>
3
4  <head>
5    <title>Computer Architecture</title>
6    <style>
7      dd {
8        font-family: cursive;
9        font-size: 20px;
10     }
11
12     dt {
13       font-family: cursive;
14     }
15
16     ol {
17       font-family: cursive;
18     }
19
20     ul {
21       font-family: cursive;
22     }
23
24     dl {
25       font-family: cursive;
26     }
27
28     p {
29       font-family: cursive;
30       text-align: left;
31       padding: 8px;
32     }
33
34     a {
35       font-size: 25px;
36       font-family: cursive;
37     }
38
39     a:link {
40       color: grey;
41       background-color: transparent;
```

```
<?index.html> ...
51     padding: 15px 25px;
52     display: inline-block;
53   }
54
55   a:hover {
56     color: red;
57     background-color: transparent;
58     text-decoration: underline;
59   }
60
61   a:active {
62     color: yellow;
63     background-color: transparent;
64     text-decoration: underline;
65   }
66
67   table {
68     font-size: 20px;
69     font-family: cursive;
70     border-collapse: collapse;
71     width: 100%;
72   }
73
74   td,
75   th {
76     border: 1px solid #dddddd;
77     text-align: center;
78     padding: 8px;
79   }
80 </style>
81 </head>
82
83 <body>
84   <p style="text-align:center; font-size:45px;">Computer Architecture</p>
85   <p style="font-size:40px;">Objectives</p>
86   <ul>
87     <li><a href="Computer.html">Computer</a></li>
88     <li><a href="Input and Output Devices.html">Input and Output Devices</a></li>
89     <li><a href="Motherboard and CPU.html">Motherboard and CPU</a></li>
90     <li><a href="Port.html">Port</a></li>
91     <li><a href="Machine Cycle.html">Machine Cycle</a></li>
92     <li><a href="Memory Hierarchy.html">Memory Hierarchy</a></li>
```




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```
<> Computer.html <> Input and Output Devices.html <> Motherboard and CPU.html <> Port.html <> References.html <> Types Of Computers.html X
<> Types Of Computers.html > ...
68 <body>
69 <p style="text-align:center; font-size:45px;">Computer Architecture</p>
70 <p style="font-size:35px;">Types of Computers</p>
71 <p style="font-size:30px;">Two basic designs of computers:</p>
72 <dl>
73 <dt style="font-size:30px;">A. Portable</dt>
74 <ol style="color: #0000FF;">
75 <li style="font-size:25px;">Laptop computers:</li>
76 <p style="font-size:20px;">&#8627; A portable computer that has a keyboard, monitor, and other devices integrated into a single compac
77 <li style="font-size:25px;">Netbooks:</li>
78 <p style="font-size:20px;">&#8627; A small, lightweight laptop computer that is generally 7 to 10 inches wide and has a longer battery
79 <li style="font-size:25px;">Tablet:</li>
80 <p style="font-size:20px;">&#8627; A portable computer integrated into a flat multitouch-sensitive screen. It uses an onscreen virtual
81 <li style="font-size:25px;">Ultrabooks:</li>
82 <p style="font-size:20px;">&#8627; A full-featured but lightweight laptop computer.</p>
83 <li style="font-size:25px;">Smartphone:</li>
84 <p style="font-size:20px;">&#8627; Does more than let you make and answer phone calls.</p>
85 <p style="font-size:20px;">&#8627; It also has productivity (application software), media player, and camera features, as well as Web
86 <p style="font-size:20px;">&#8627; A smartphone has a CPU, memory, and storage just like a laptop computer.</p>
87 </ol>
88 </dl>
89 <dl>
90 <dt style="font-size:30px;">B. Stationary</dt>
91 <ol style="color: #0000FF;">
92 <li style="font-size:25px;">Supercomputer:</li>
93 <p style="font-size:20px;">&#8627; Performs complex calculations extremely rapidly.</p>
94 <p style="font-size:20px;">&#8627; Designed to handle many programs running at the same time.</p>
95 <li style="font-size:25px;">Mainframe:</li>
96 <p style="font-size:20px;">&#8627; Supports many users simultaneously.</p>
97 <p style="font-size:20px;">&#8627; Designed to execute a few programs as quickly as possible.</p>
98 <li style="font-size:25px;">Desktop computers:</li>
99 <p style="font-size:20px;">&#8627; A large, expensive computer that Separate case plus peripheral devices.</p>
100 <p style="font-size:20px;">&#8627; Used in businesses that manage large amounts of data.</p>
101 <li style="font-size:25px;">Embedded:</li>
102 <p style="font-size:20px;">&#8627; Specially designed computer chip that resides in another device.</p>
103 <p style="font-size:20px;">&#8627; Self-contained computer devices performing dedicated functions.</p>
104 </ol>
105 </dl>
106 <a href="index.html">Go To Main Page</a>
107 </body>
108 </html>
```

```
<> Computer.html <> Input and Output Devices.html <> Motherboard and CPU.html <> Memory Vs. Storage.html X
<> Memory Vs. Storage.html > ...
114 &#9755; Magnetic:<br>
115 &#8627; Hardware that uses disks or tapes that are coated with magnetic material.<br>
116 &#9755; Optical:<br>
117 &#8627; Hardware that uses laser beams to read data from plastic disks.<br>
118 &#9755; Solid State:<br>
119 &#8627; Devices that use nonvolatile memory chips to read and write data.
120 </p>
121 <p style="font-size:30px;">The Storage Hierarchy</p>
122 <p style="font-size:20px; color: #0000FF;">
123 &#10148; Storage hierarchy consists of three levels. They are:<br>
124 &#9755; Online storage:<br>
125 &#8627; Also called primary storage, it is made up of the storage devices that are actively available
126 &#9755; Near-online storage:<br>
127 &#8627; Also called secondary storage, it is not readily available to the computer system. The user pe
128 &#9755; Offline storage:<br>
129 &#8627; Also called tertiary storage or archival storage, it is not readily available to the computer
130 </p>
131 <p style="font-size:30px;">Capacity and Speed of Storage Devices</p>
132 <table>
133 <tr>
134 <th rowspan="2">Image</th>
135 <th>Floppy Disk</th>
136 <th>Hard Drive</th>
137 <th>CD ROM / DVD</th>
138 </tr>
139 <tr>
140 <td></td>
141 <td></td>
142 <td></td>
143 </tr>
144 <tr>
145 <th>Capacity</th>
146 <td>720 KB to 1.44 MB</td>
147 <td>Up to 1 TB</td>
148 <td>CD-ROM 650 MB; DVD 17 GB</td>
149 </tr>
150 <tr>
151 <th>Access Time</th>
152 <td>100 ms</td>
153 <td>6 to 12 ms</td>
154 <td>80 to 800 ms</td>
```



```
<> Computer.html X <> Input and Output Devices.html <> Machine Cycle.html <> Motherboard and CPU.html <> Pt 18
<> Computer.html > html > head > style > table
92  &#8627; 0 or 1.<br>
93  &#8680; Byte.<br>
94  &#8627; Unique combinations of 8 bits of 0s and 1s.<br>
95  &#8680; Kilobytes, megabytes, gigabytes, and terabytes.
96  </p>
97  <table>
98  <tr>
99  <th>Name</th>
100 <th>Abbreviation</th>
101 <th>Number Of Bytes</th>
102 </tr>
103 <tr>
104 <td>Byte</td>
105 <td>B</td>
106 <td>1 Byte</td>
107 </tr>
108 <tr>
109 <td>Kilobyte</td>
110 <td>KB</td>
111 <td>1,024 Bytes (2<sup>10</sup> Bytes) &asymp; 10<sup>3</sup></td>
112 </tr>
113 <tr>
114 <td>Megabyte</td>
115 <td>MB</td>
116 <td>1,048,576 Bytes (2<sup>20</sup> Bytes) &#8776; 10<sup>6</sup></td>
117 </tr>
118 <tr>
119 <td>Gigabyte</td>
120 <td>GB</td>
121 <td>1,073,741,824 Bytes (2<sup>30</sup> Bytes) &#8776; 10<sup>9</sup></td>
122 </tr>
123 <tr>
124 <td>Terabyte</td>
125 <td>TB</td>
126 <td>1,099,511,627,776 Bytes (2<sup>40</sup> Bytes) &#8776; 10<sup>12</sup></td>
127 </tr>
128 </table>
129 <p style="font-size:30px;">The Language of Computers</p>
130 <p style="font-size:20px; color: rgba(245, 12, 12, 0.966);" >
131 &#9758; Computer uses combination of hardware and software to process data into information.<br>
132 &#8627; Hardware is any part of the computer you can physically touch.<br>
133 &#8627; Software is any part of the computer you cannot physically touch.<br>
```