**THE MOST IMPORTANT ADTs**

1. Study the main aspects of the ADTs **TREE**, **BINARY TREE**, **GRAPH and WEIGHTED GRAPH** described in the following table.

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| **ADT** | **DATA** | **OPERATIONS** | **EXAMPLE** |
| Tree | * Set of **nodes** connected with each other in a hierarchical way * Each element is connected downwards to N nodes (**children**) * Each element is connected upwards to 1 node (**parent**) * Exception: the first node has no father (**root**) * Some nodes have no children (**leaves**) | * Insert element (any position) * Remove element (any position) * Insertion and removal have to maintain the tree structure * Search element |  |
| Binary tree | * Set of **nodes** connected with each other in a hierarchical way * Each element is connected downwards to max 2 nodes (**children**) * Each element is connected upwards to 1 node (**parent**) * Exception: the first node has no father (**root**) * Some nodes have no children (**leaves**) | * Insert element (any position) * Remove element (leaf) * Insertion and removal have to maintain the binary structure * Search element |  |
| Graph | * Set of **nodes** connected with each other through **edges** (or **arches** or **branches**) * Each node can be connected to N other nodes (N >=0) | * Insert element (any position) * Remove element (any position) * Insertion and removal of a node affects also the edges connecting it to the rest of the graph * Search element * Search a **path** between two nodes |  |
| Weighted graph | * Set of **nodes** connected with each other through **edges** (or **arches** or **branches**) * Each element can be connected to 1 or to N other nodes * Each edge has a value (**weight**) | * Insert element (any position) * Remove element (any position) * Search element * Calculation of the **path** between two nodes using weights |  |