**Association** is a simple structural connection or channel between classes and **is a** relationship where all objects have their own lifecycle and there is no owner. Both can create and delete independently.

* One to One
* One to Many
* Many to One, and
* Many to Many

**Many to One**: Multiple students can associate with a single Department

**One to Many**: Single student can associate with multiple Departments, but there is no ownership between the objects and both have their own lifecycle. Both can create and delete independently.

**Aggregation** is a specialize form of Association where all object have their own lifecycle but there is a ownership like parent and child. **Child object can not belong to another parent object at the same time**. We can think of it as "**has-a**" relationship.

A single Employee can not belong to multiple Companies (legally!! ), but if we delete the Company, Employee object will not destroy.

**Composition** is again specialize form of Aggregation. It is a strong type of Aggregation. Here the Parent and Child objects have coincident lifetimes. Child object **dose not have it's own lifecycle** and if parent object gets deleted, then all of it's child objects will also be deleted.

House can contain multiple rooms there is no independent life for room and any room can not belong to two different house. If we delete the house room will also be automatically deleted.

**Aggregation and Composition:**

Holding the reference of the other class within some other class is known **as composition.**

Aggregation represents weak relationship whereas composition represents strong relationship. For example: bike has an indicator (aggregation) but bike has an engine (compostion).

**Association:**

1. Create a folder called "Links"
2. Create a shortcut/link inside this folder and link it to [www.go4expert.com](http://www.go4expert.com/)
3. Create another shortcut/link instide this folder and link it to [www.google.com](http://www.google.com/)
4. Ask your friend to do the same on another machine using same links ([www.go4expert.com](http://www.go4expert.com/) and [www.google.com](http://www.google.com/))
5. Delete the "Links" folder, and open your browser to check if [www.go4expert.com](http://www.go4expert.com/) and [www.google.com](http://www.google.com/) still exist or not ;)

Briefly, Association is a relationship where all the objects have different lifecycles. there is no owner.

**Aggregation:**

1. Create a file called file.txt
2. Make a simple Application to open the File.txt (rw mode), but don't program it close the connection.
3. Run an instance of this application (it should work ok and can open the file for rw)
4. Keep the first instance, and run another instance of this application (In theory it should complain that it can't open the file in rw mode because it is already used by other application).
5. Close the 2 instances (make sure you close the connection).

From the above application, we understand that the Application and the File has a separate lifecycles, however this file can be opened only by one application simuletanously (there is only one parent at the same time, however, this parent can move the child to another parent or can make it orphan).

**Composition:**

1. Open a new Document name it as test.txt
2. Write this sentence inside this document "This is a composition".
3. Save the document.
4. Now, delete this document.

This is what is called composition, you can't move the sentence "This is a omposition" from the document because its lifecycle is linked to the parent (i.e. the document here !!)