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The notion of an extension of an infinity algebra by another infinity algebra has parallels to the classic extension picture for associative or Lie algebras. In this talk, we give a definition of module which is more general than has appeared in the literature, appropriate for the notion of extensions by a module. We give a more restricted version of a morphism of infinity algebras, which is well behaved under kernel and cokernel operations. The leading term of an infinity algebra is an infinity algebra of fixed degree, which means that reducing to extensions of an algebra of fixed degree by a similar one is the most important step in constructing general extensions. We introduce a descending set of coboundary operators, each defined on the previous cohomology, which is related to the construction of extensions. Finally, we have constructed all infinity algebras of some low degrees for some low dimensional A-infinity algebras, and find that some simple algebras have nontrivial deformations. (Received February 12, 2011)