Assumptions for Flexure Theory and Two Way Slab

What are positive moment, negative moment and reinforcement regarding beam?
A moment that causes compression on top surface of a beam and tension on the bottom surface will be called a positive moment.   A moment that causes tension on top surface of a beam and compression on the bottom surface will be called a negative moment. The steel provided in the positive moment region is called positive reinforcement and the steel provided in the negative moment region is called negative reinforcement.
Slab reinforcement: Main reinforcement: Used to resist bending moment due to Live and dead load.
Shrinkage and temperature reinforcement: Used to prevent cracking from shrinkage/contraction of the concrete due to water loss from concrete mass at different stages, temperature variation and differential thermal gradient.

What are the assumptions for flexure theory in beam design?
There are three basic assumptions for flexure
  I. Sections perpendicular to the axis of bending which are plane before bending remain plane after bending.
 II. The strain is in the reinforcement is equal to the strain in the concrete at the same level.
III. The stresses in the concrete and reinforcement can be computed from the strains using stress- strain curves for concrete and steel.

Additional
 IV. The tensile strength of concrete is neglected in flexural strength calculations (ACI sec. 10.2.5).
  V. Concrete is assumed to fail when the compressive strain reaches a limiting value.

 VI. The compressive stress strain relationship for concrete may be assumed to be rectangular, trapezoidal, parabolic or any other shape that results in prediction of strength in substantial agreement with results of comprehensive tests (ACI 10.2.6).

Define Slab
Slab is a common term used to describe the structural elements such as floors and roofs where the thickness of the element is very small compared to the length and width. Rectangular Slabs are mainly two types: one-way and two-way.
One-way slab means the load is transferred in one direction, therefore, the bending occurs in one direction only. When a rectangular slab is supported on all four sides, but the ratio of longer side, L, to shorter side, S, is two or more, $L/S \geq 2.0$, then the slab will act as a one-way slab, with bending primarily occurring in the short direction. *Such slabs are designed as one-way slabs where the span length (L_n) is equal to the length of short direction.*
Here, main reinforcement is placed in the shorter direction which is the span, while shrinkage reinforcement is provided in the longer direction to limit cracking.
Note: Special case: When the slab is supported on two sides only, which is uncommon, the load will be transferred to these sides regardless of its longer span to shorter span ratio, and it will be classified as one-way slab.

What is a Two Way Slab?
Two-way slab means the load is transferred in two directions, therefore, the bending occurs in two directions. In this case, Long span/Short span is less than 2.0 or L/S< 2.
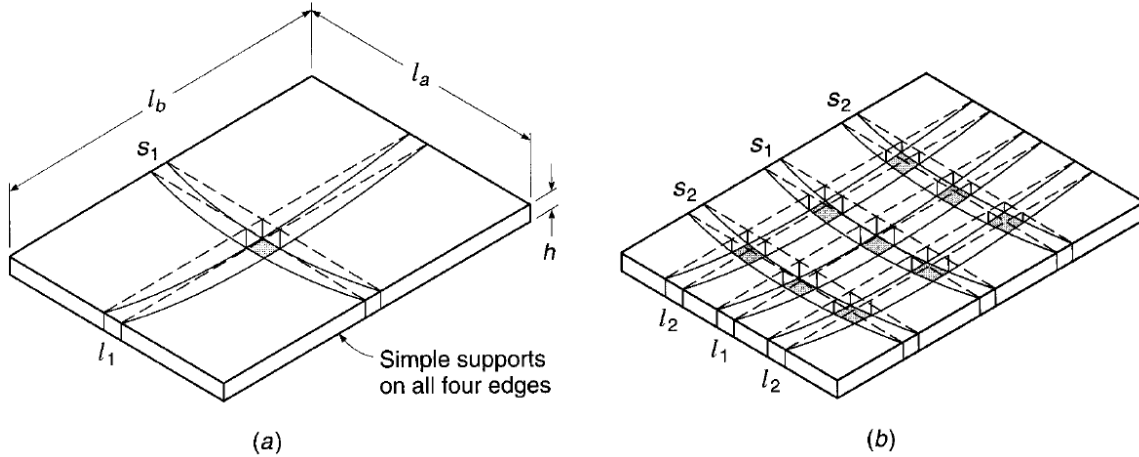

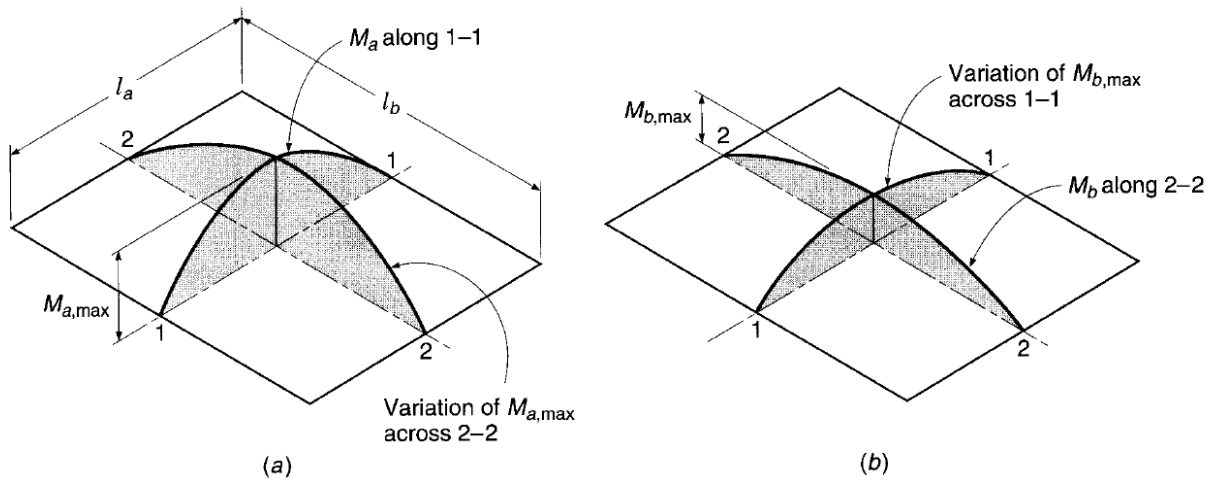Figure: Two way slab (a) Bending of center strip, (b) grid model

Figure: Moment variations of a uniformly loaded slab with simple supports on four sides.

One way slab   Two way slab