Pinned Frames
- structures with at least one 3 force body
- connected with pins
- reactions are equal and opposite
  - non-rigid
  - rigid

Rigid Frames
- rigid frames have no pins
- frame is all one body
- typically statically indeterminate
- types
  - portal
  - gable

Rigid Frames with PINS
- frame pieces with connecting pins
- not necessarily symmetrical
**Internal Pin Connections**

- **statically determinant**
  - 3 equations per body
  - 2 reactions per pin + support forces

**Arches**

- **ancient**
- **traditional shape to span long distances**

**Arches**

- **primarily sees compression**
- **a brick “likes an arch”**

- **behavior**
  - thrust related to height to width
**Three-Hinged Arch**

- **statically determinant**
  - 2 bodies, 6 equilibrium equations
  - 4 support, 2 pin reactions (=6)

**Procedure**

- solve for all support forces you can
- draw a FBD of each member
  - pins are integral with member
  - pins with loads should belong to 3+ force bodies
  - pin forces are equal and opposite on connecting bodies
  - identify 2 force bodies vs. 3+ force bodies
  - use all equilibrium equations

![Three-Hinged Arch Diagram]