pinned frames, hinged arches
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”
Arches

• 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