

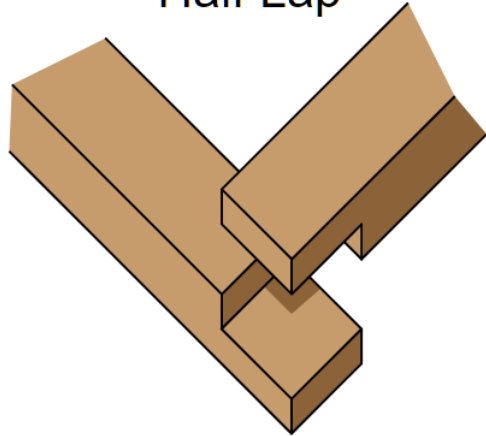
# Carpentry Shop

- ❑ Carpentry may be defined as the process of making wooden components. It starts from a marketable form of wood and ends with finished products. It deals with the building work, furniture, cabinet making, etc.
- ❑ In carpentry, preparation of joints (joinery) is one of the important operations in all woodworks. It deals with the specific work of carpenter like making different types of joints to form a finished product.
- ❑ Although in today's industries most of the work is done by automatic machines which produces the jobs with good accuracy but still it (job) requires some hand operations called carpentry operations. The person working in the carpentry shop is called carpenter.

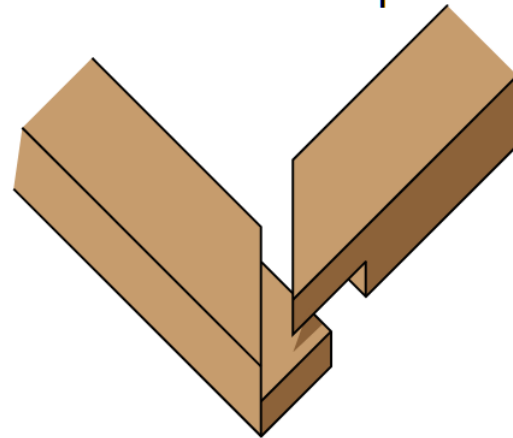


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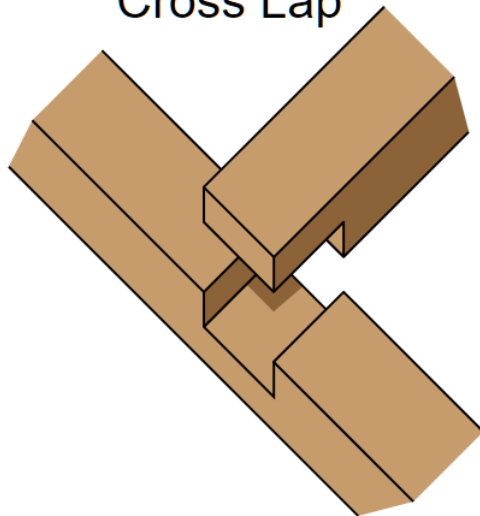
Half Lap



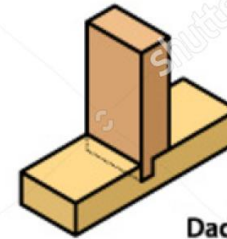
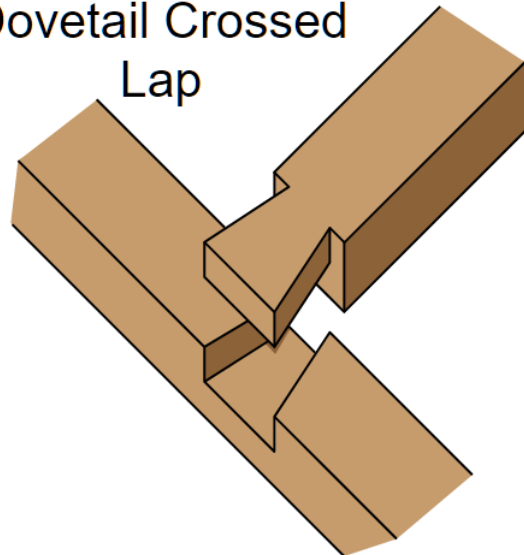
Mitred Half Lap



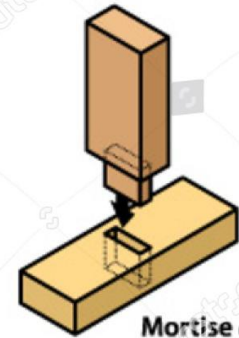
Cross Lap



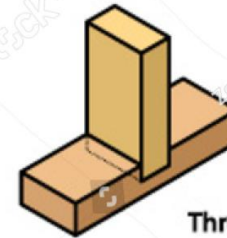
Dovetail Crossed Lap



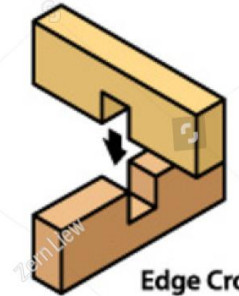
Dado Rabbet Joint



Mortise & Tenon Joint



Through Dado Joint



Edge Cross Lap Joint



Half Cross Lap Joint



Tee Lap Joint

# TOOLS used in Carpentry Shop

Carpentry shop tools are classified as below:

- Work Holding Devices/ Clamping Tools.
- Measuring Tools.
- Marking Tools.
- Cutting Tools.
- Striking Tools.
- Drilling Tools.
- Planing Tools.

## *WORK HOLDING DEVICES /CLAMPING TOOLS*

### *1. Work Bench:*

A carpentry process can be done at various places, but most of the important operations of fitting are generally carried out on a table called work bench.

The work bench is a strong, heavy and rigid table made up of hard wood.

The size of the work bench required is about 150 to 180 cm length, nearly 90 cm width and approximately 76 to 84 cm height

## 2. CARPENTRY BENCH VICE:

It is firmly fixed to the bench with the help of nuts and bolts. It consists of a cast Iron body and cast iron jaws. One jaw is fixed to the body and the second slides on a square threaded screw with the help of a handle.

The jaws are opened as per vice specification; job is placed in the two jaws and is fully tightened with the help of handle. Handle is used to move the movable jaw





### 3. BAR CLAMP:

It is used for holding wide work such as box or frame constructions and jointed boards. It consists of a steel bar fitted with two jaws, one of which is movable by a screw and the other is fixed into one of the spaced holes by fastening pin.



### 4. C-CLAMP:

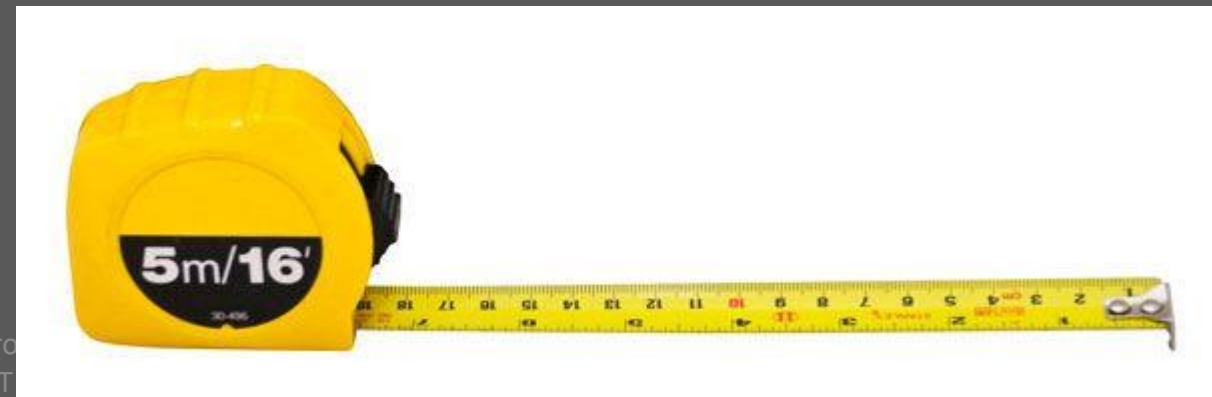
It is used for holding small work on the bench. It consists of a frame with a jaw at one end, and a movable jaw, which is operated by a screw and a thumb nut, at the other end.



# MEASURING TOOLS

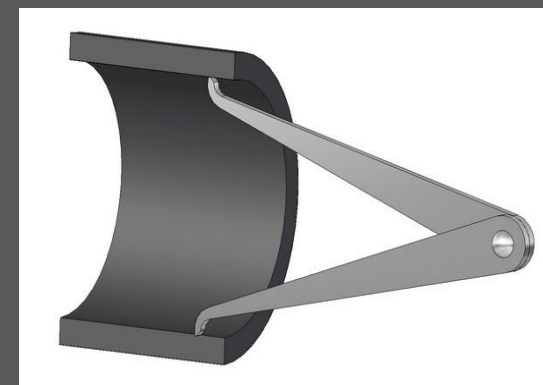
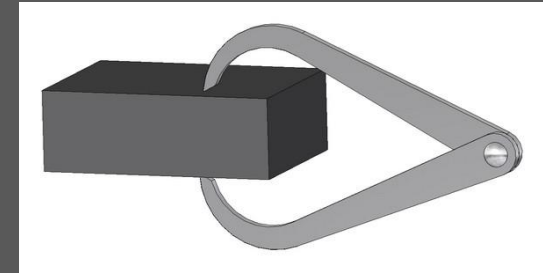
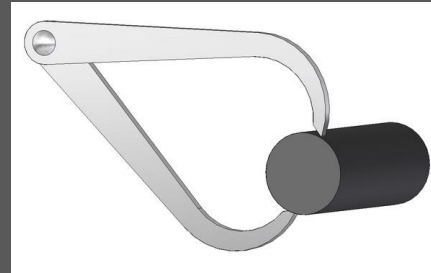
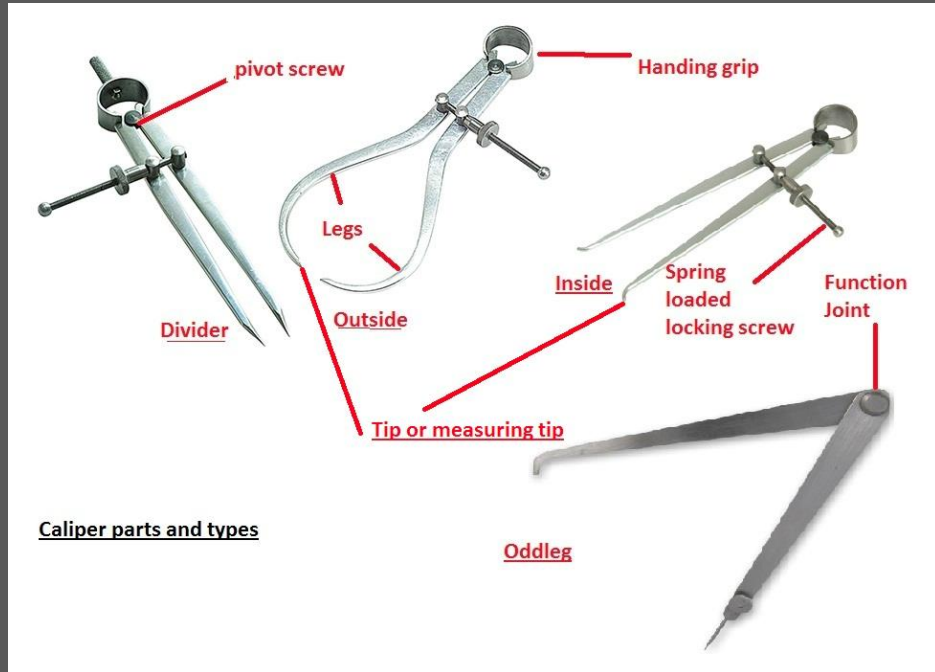
## 1. Steel Rule

It consists of a hardened steel strip having line graduation etched or engraved in it. They are usually 150 mm or 300 mm long and are used to take linear measurement to an accuracy of 1 mm or 0.5 mm. These are marked in inches or millimeters. All the faces are machined true. The edges of a steel rule should be protected from rough handling.



## 2. Calipers

These are generally used to measure the inside or outside diameters. Different types are:



- i. **Outside Caliper:** It is used to measure the outside dimensions.
- ii. **Inside Caliper:** It is used to measure the inside dimensions
- iii. **Jenny or Oddleg Caliper:** One leg is bent at the tip inwardly and the other has a straight pointed end. It is used to scribe lines parallel to the straight edges

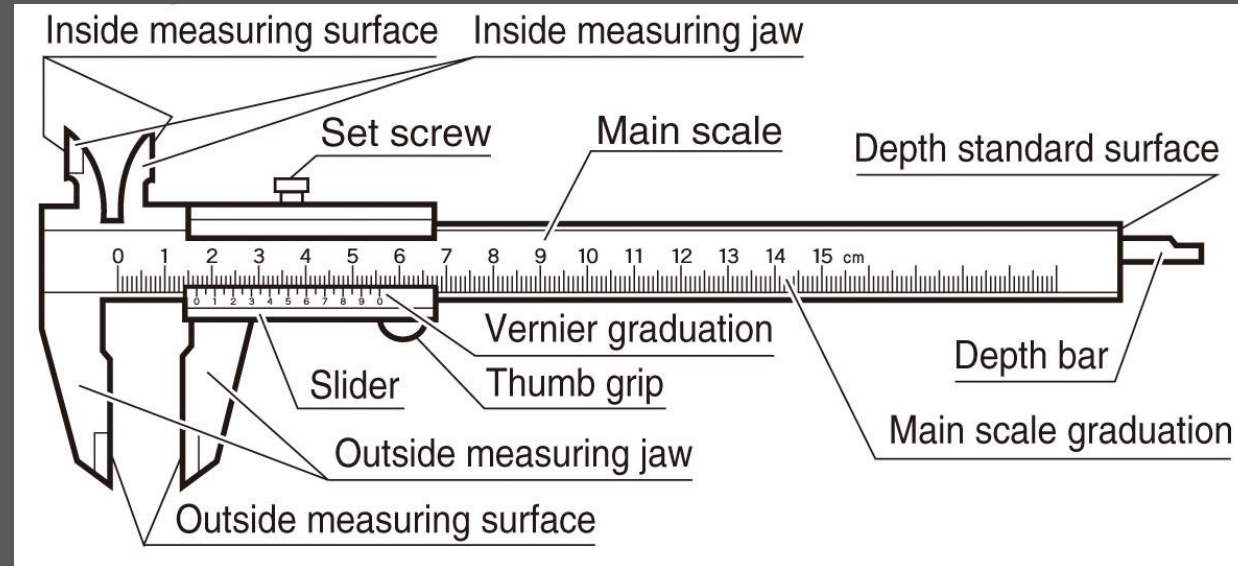




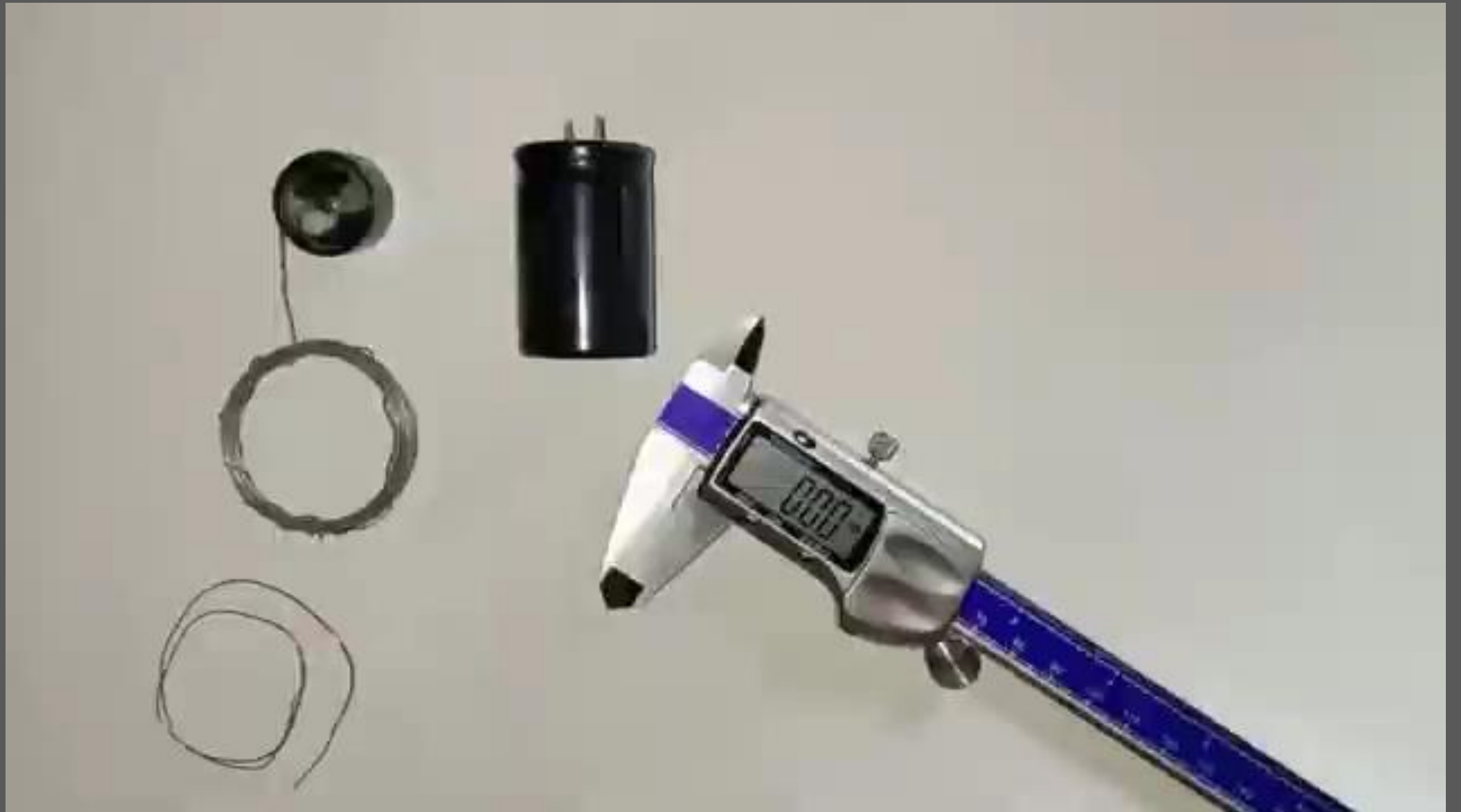


### 3. Vernier Caliper:

It is used for measuring the outer dimensions of round, flat, square components and also the inner size of the holes and bore. A narrow blade is used to measure the depth of bar slots etc. The reading accuracy in metric system is 0.02 mm. It is made of stainless steel.



ACADEMIC GAIN TUTORIALS



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# MARKING TOOLS

**MARKING GAUGE:** It is a tool used to mark lines parallel to the edge of a wooden piece. It consists of a square wooden stem with a sliding wooden stock (head) on it. On the stem is fitted a marking pin, made of steel. The stock is set at any desired distance from the marking point and fixed in position by a screw. It must be ensured that the marking pin project through the stem, about 3 mm and the end is sharp enough to make a very fine line.

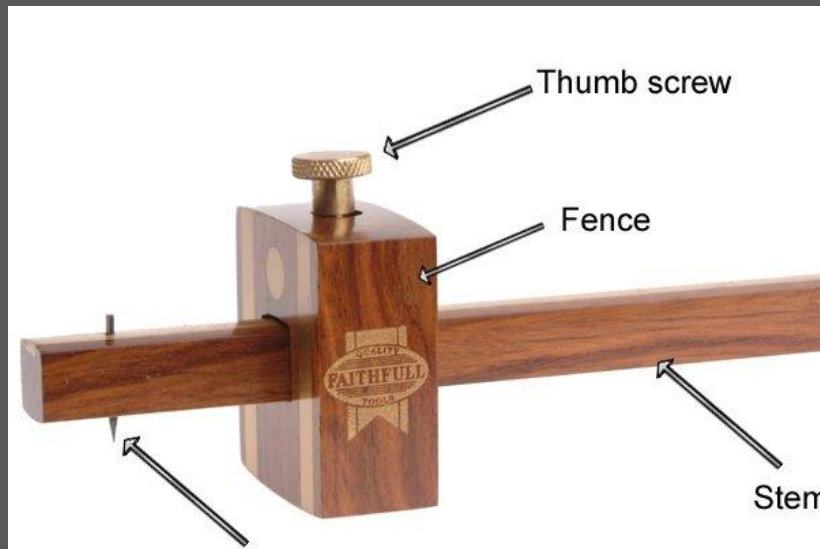
**MORTISE GAUGE:** It consists of two pins. In this, it is possible to adjust the distance between the pins, to draw two parallel lines on the stock.

**COMPASS AND DIVIDER:** It is used for marking arcs and circles on the planed surfaces of the wood.

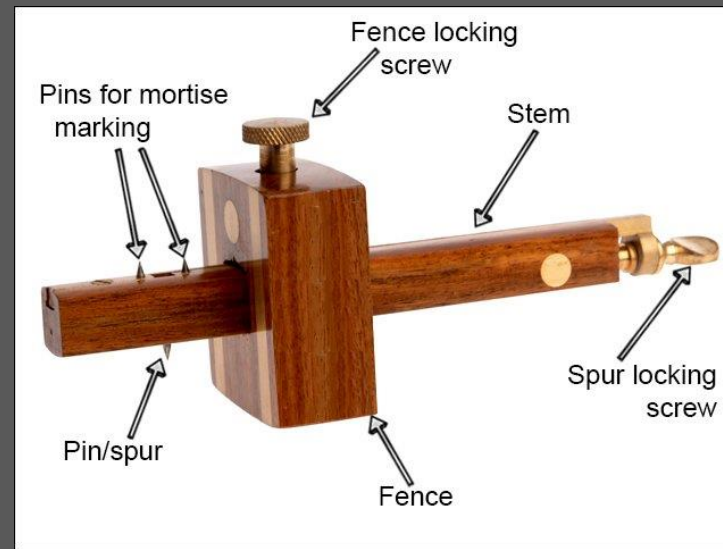
**SCRIBER OR MARKING KNIFE:** It is used for marking on timber . It is made of steel, having one end pointed and the other end formed into a sharp cutting edge.

**BEVEL SQUARE:** It is used for laying-out and checking angles. The blade of the bevel is adjustable and may be held in place by a thumb screw. After it is set to the desired angle, it can be used in much the same way as a try-square. A good way to set it to the required angle is to mark the angle on a surface and then adjust the blade to fit the angle.

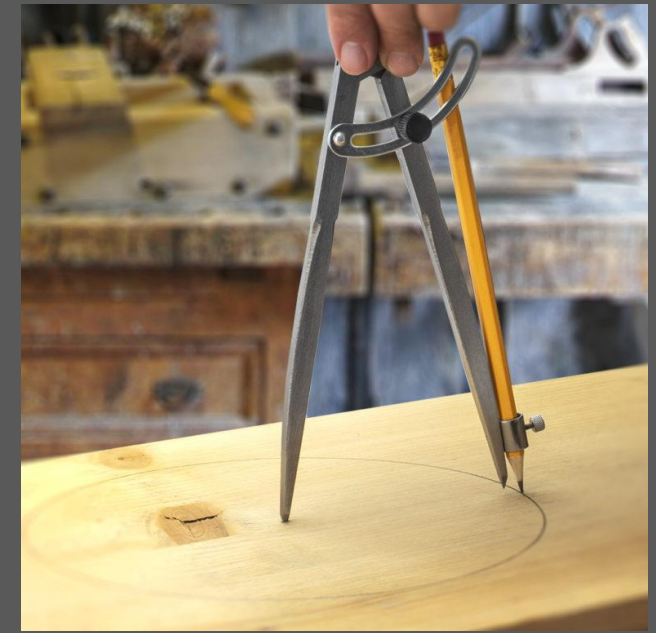




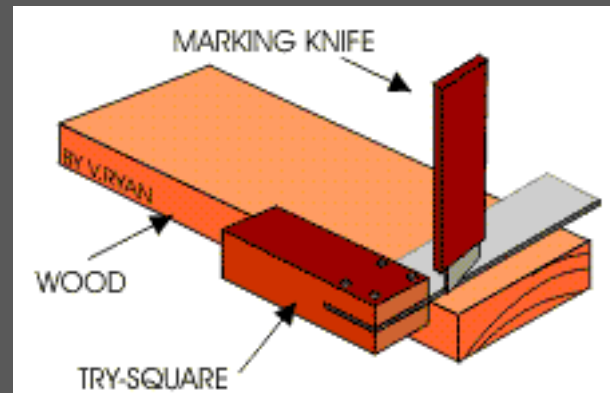
**MARKING GAUGE**



**MORTISE GAUGE**



**COMPASS AND DIVIDER**



**SCRIBER OR MARKING KNIFE**



**BEVEL SQUARE**



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# CUTTING TOOLS

## 1. Saw

Saw is used for cutting of wood. It consists of a handle, which is made from wood, plastic or aluminum. The blade is made up of high carbon steel or spring steel.

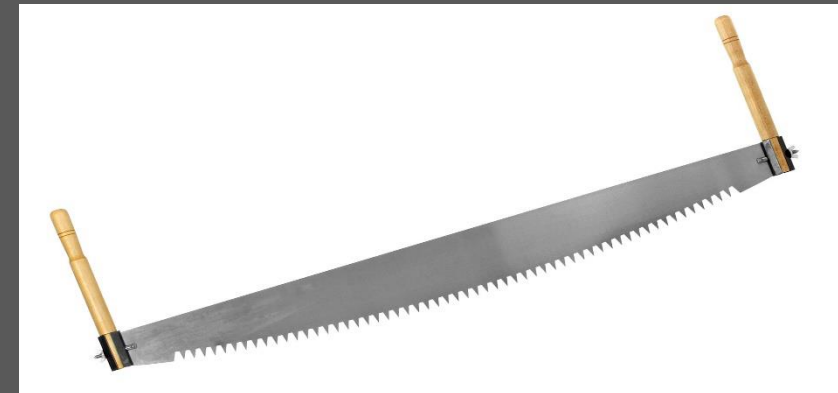
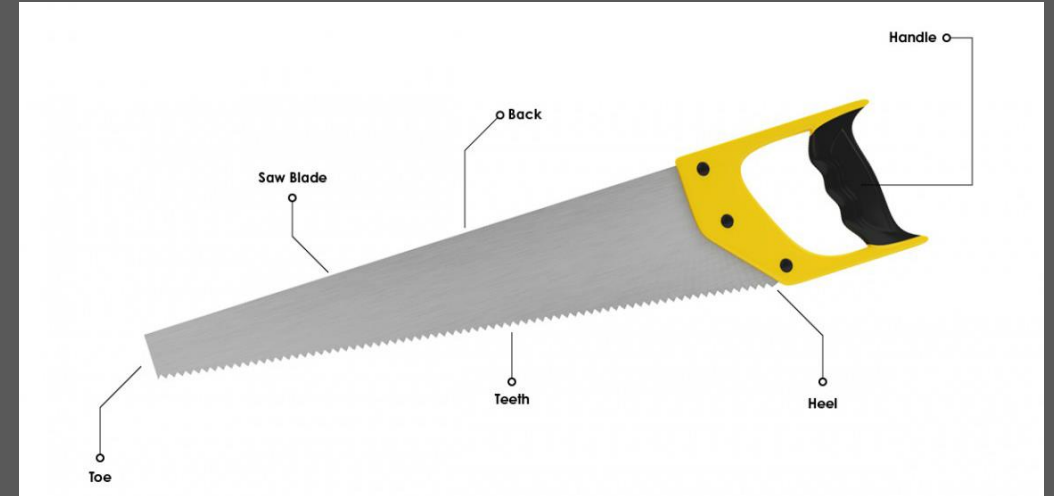
The points of the teeth are bent in a zig-zag fashion, to cut a wide groove and prevent the body of the blade from rubbing or jamming in the saw cut. The teeth of the blades are generally forward cut so in the case, pressure is applied in the forward direction only.

Depending upon the direction of cut, blades are classified as:

- Forward cut
- Backward cut.

### ***a. CROSS CUT SAW:***

It is used for cutting the wood across the grains (Hand saw). Its teeth are pointed. The pitch of the teeth is about 2.5 to 3.0mm and blade length is about 600mm. Its teeth have less 'set' than the rip saw.

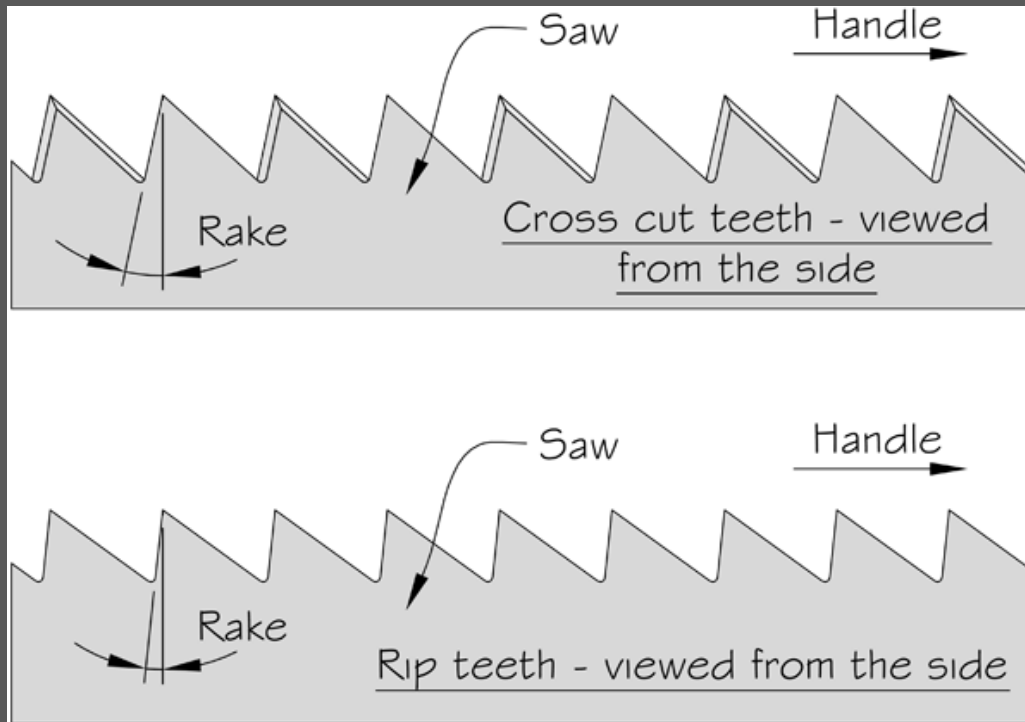






### **b. RIP SAW:**

It is used for cutting the wood along the grains. Its teeth have chisel edge. The pitch of the teeth is about 5 to 8mm and length of the blade is about 700mm. The process of cutting the wood along the grains is called ripping. Because of high flexibility of the blade and also number of cutting points per cm (i.e., high pitch) it is not suitable for cutting across the grains.



***c. TENON SAW:***

Tenon saw or back saw is used for cutting small work. It is mostly adapted in joint work. It has a brass or steel back which strengthens the blade, but it restricts the depth of cut. Its fine teeth (6 to 8teeth/cm) and stiff back permits the smooth, accurate cutting for marking joints. The saw is available in different length ranging from 250 to 400 mm.



***d. Compass or turning saw***

***e. Keyhole saw***



## 2. Chisels

In the wood work a large number of chisels are used for cutting the wood in different manners to produce desired shapes and varieties.

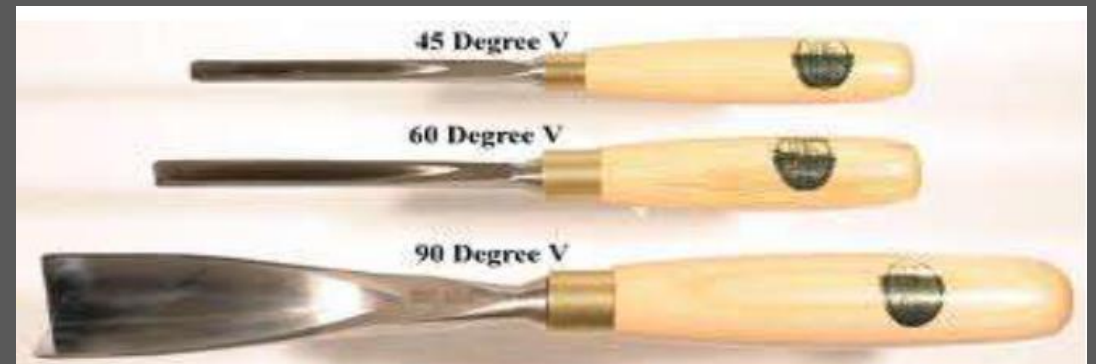
**1. Firmer Chisel:** This chisel has a flat blade about 100 to 150 mm long and 3 to 5 mm thick. It is the most general purpose chisel. It is used by hand pressure or mallet depending on the amount of material to be removed. Width varies from 3 to 50 mm.



**2. Bevelled Edge Firmer Chisel:** Also known as dovetail chisel this type of chisel has beveled edges as shown. The beveling of the edges reduces the thickness of the chisel at the sides enabling it to enter sharp corners and finish them. This chisel is used for fine and delicate work.



**3. Paring Chisel:** Firmer and beveled edge firmer chisels when made with long thin blade are known as paring chisels. Such chisels are generally manipulated by hand and are 5 to 50 mm wide and 225 to 500 mm long.





**4. Mortise Chisel:** This type of chisel is used for taking heavy and deep cuts resulting in more stock removal as in making mortises. It is made with a heavy blade with generous shoulder or collar to withstand the larger force of the mallet blows. Blades vary in width from 3 to 16 mm. The blade thickness is from 6 to 15 mm.



**5. Socket chisel:** A socket chisel comprises of a cone-shaped handle which sits on the metal socket of the chisel. Because of these socket-type handles, these chisels can take a lot of beating by the mallet and do not crack with pressure. Socket chisels can be used in heavy-duty woodworking as they can withstand the abuse of the mallet.



**6. Gouge chisel:** The Gouge is a chisel with a rounded or angular tip used to cut curves and hollows.

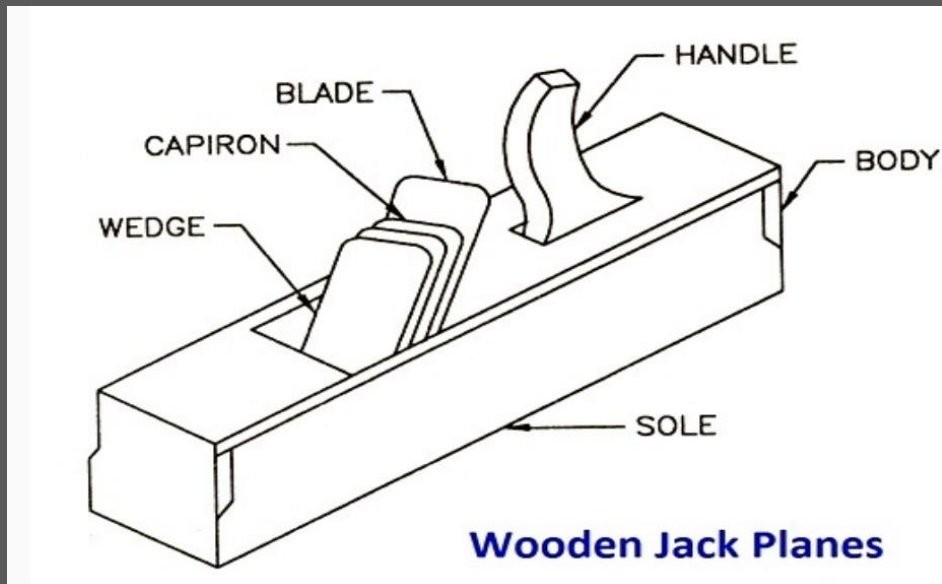




# Planning Tools

The planning tools are used for shaving or smoothing plane surfaces. A plane may be described as a chisel fastened to a metallic or wooden block called body. The Chisel fastened to the body at an angle of 25 to 35 degree respectively. Another Blade called Cap Iron is used for stiffening the cutting blade, prevents chattering and helps in cutting and curling of shavings. The Cap iron should be 1.5mm above the cutting edge.

1. Wooden Jack Plane
2. Iron Jack Plane
3. Smoothing Plane







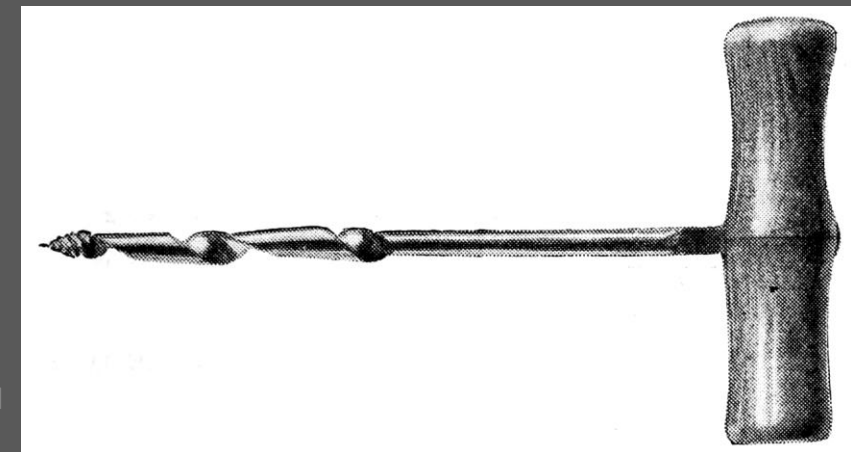
# Boring and Drilling Tools

These tools are used for producing holes in wood.

**Auger:** Auger is a long steel bar with a fluted body for half of its length and an eye at the top through which a handle can be fitted for turning the auger. A small screw is provided at the bottom of the auger to serve as a pilot in starting a hole. The auger is operated by holding the handle in both hands and rotating while simultaneously pressing downwards. Augers are chiefly used for rough structural work and are available in various sizes up to 25 mm diameter. Small auger bits are also available for use with braces.

**Auger Bit:** An auger bit as mentioned earlier is a small auger. It has a screw point and a helical or twisted stem. This bit produces long, clean and accurate holes from 6 to 35 mm diameter a longor across the grains. Since the whole body of the bit is fluted, removal of shavings is easier and as such this bit is extremely useful for drilling deep holes.

**Gimlet:** A gimlet is a smaller form of auger and is used for producing small holes. It is operated in the same way as the auger.



**4. Bradawl:** It is very simple tool. Woodworkers use this bradawl tool for boring small and shallow holes. It is vital for boring holes for small to medium sizes screws.

**5. Brace and Bits:** The Brace, which is a hand tool, is used for boring hole. It consist head, cranked handle, chuck and frame. Some braces may contain ratchet, which is placed just behind chuck. These wood boring tools are 'U' shaped. It generates more torque than a hand drill. They are ideal for use with larger bits like auger bits, forstner bits, countersink bits etc.

#### **6. Hand Drill**



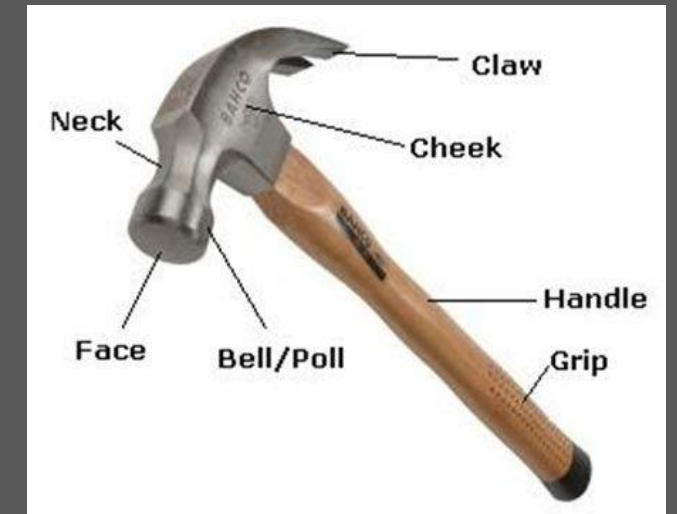
# Striking Tools

Striking or impelling tools are used for driving chisels and nails into the wood and for assembly work.

**Mallet:** A mallet is a small wooden hammer of round or rectangular cross section. It is made of hard wood. A mallet is used to give light blows to the cutting tools with wooden heads such as chisels and gouges.



**Hammers:** Two types of hammers are normally used in wood working: cross peen hammer and the claw hammer. The cross peen hammer is used for light bench work. It has cast steel head with the face and peen being tempered. The handle is made of either wood or bamboo.



# File and Rasp

A file is a tool used to remove fine amounts of material from a workpiece. It is common in woodworking, metalworking. A rasp is a form of file with distinct, individually cut teeth used for coarsely removing large amounts of material.

**Flat file**



**Rat tail file**



**Half round file**



**Square file**



**Round file**







# Wood Working Processes

1. Marking and Laying out
2. Sawing
3. Planning
4. Mortising and Tenoning
5. Boring
6. Grooving and Tonguening
7. Moulding
8. Rebating
9. Recessing

# Carpentry Joints

1. Halving

(a) Corner Lap joint

(b) T- lap Joint

(c) Dove-Tail Joint

(d) Cross-Lap Joint

2. Mitre Joint

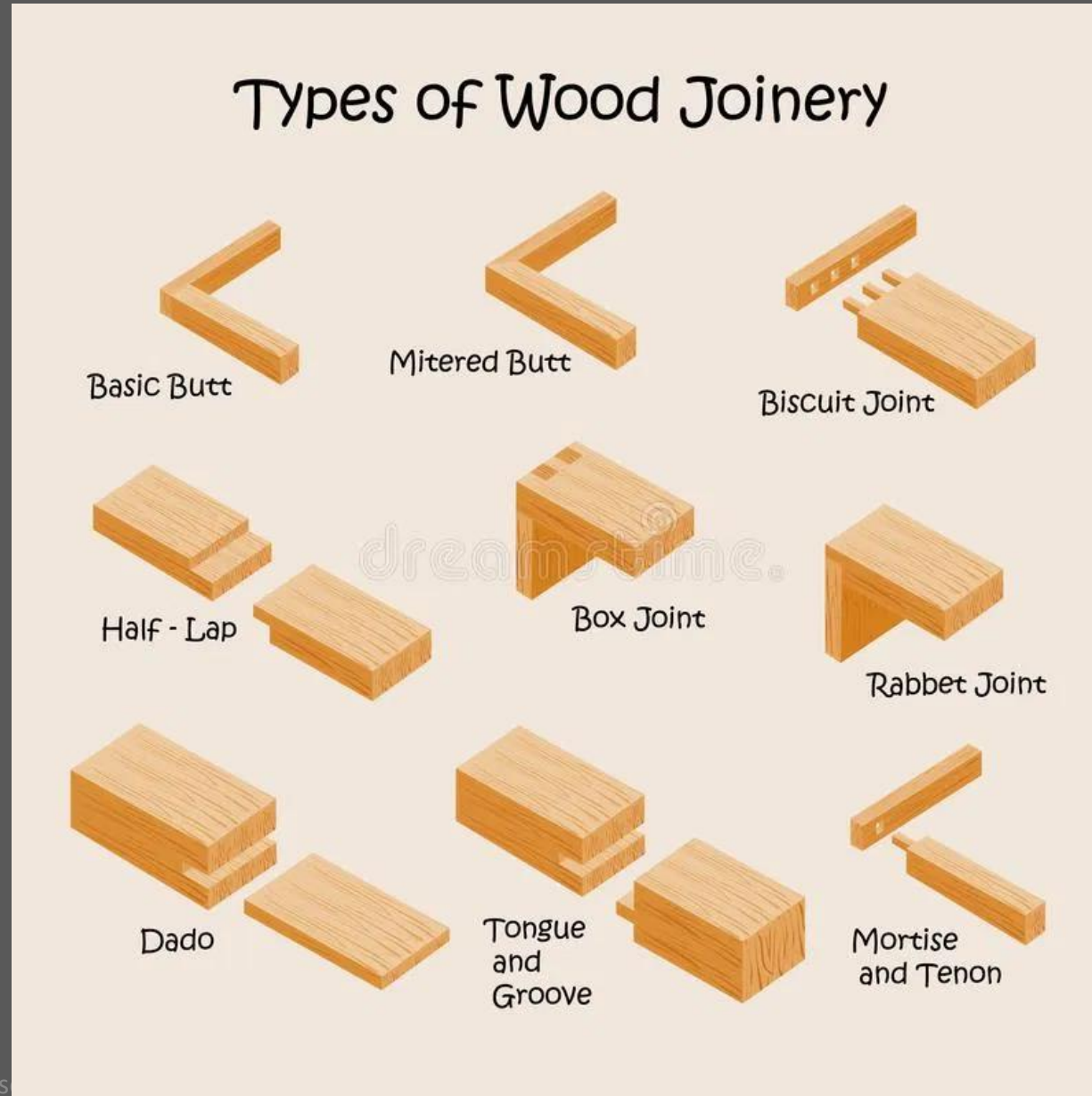
3. Mortise and Tenon Joint

4. Briddle Joint

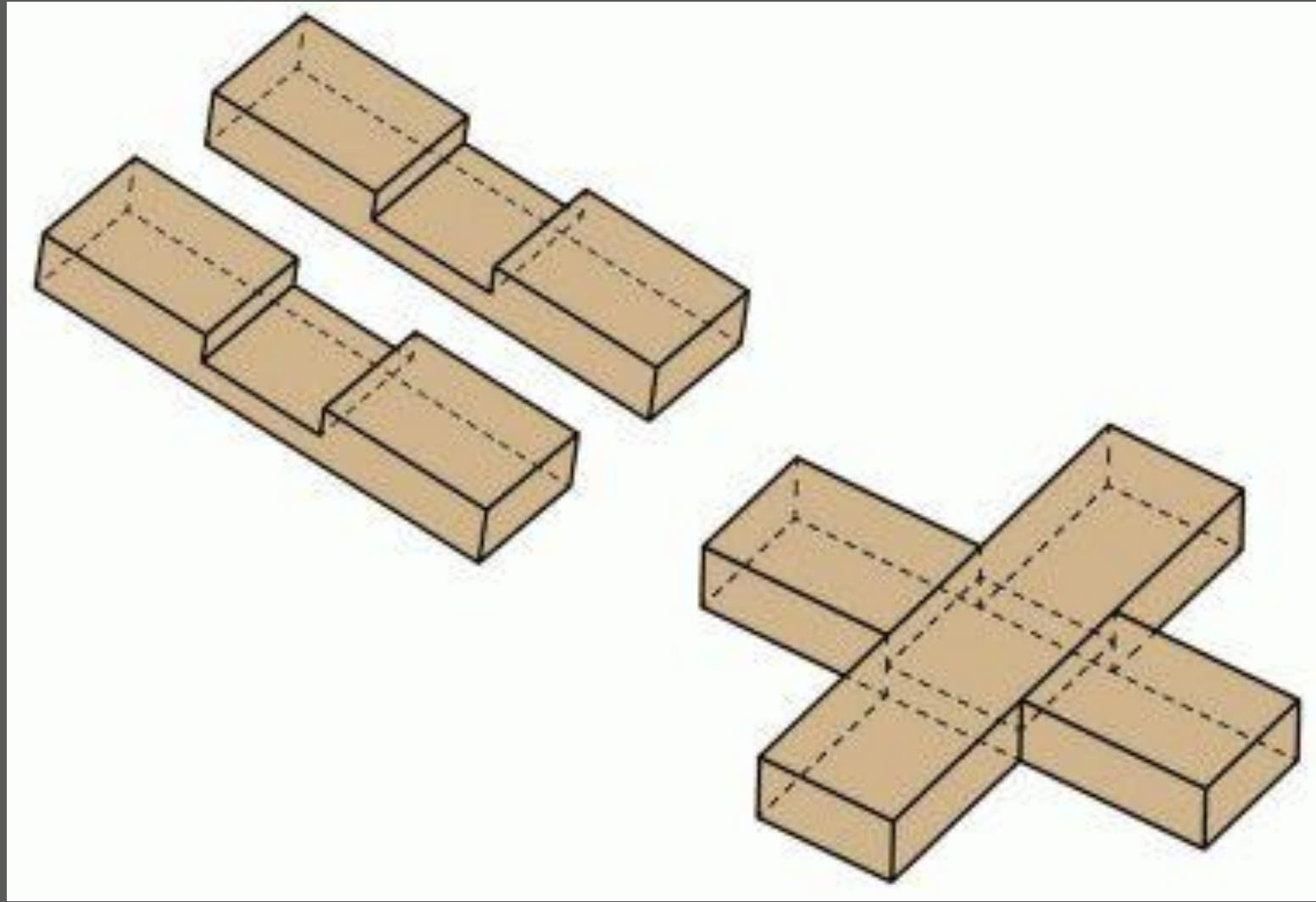
5. Grooving and Tongueing

6. Dove- Tail Joint

7. Dovel Joint



## Job-1: Cross Joint



## Job 2: Mortise and Tenon joint

