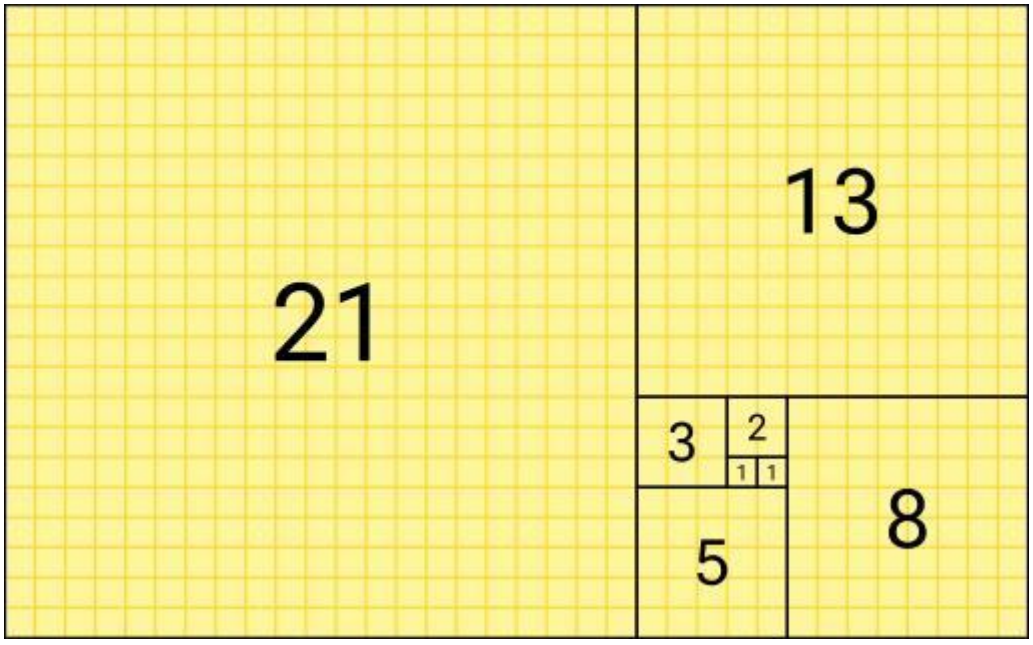
Fibonacci number

In mathematics, the Fibonacci numbers, commonly denoted Fn , form a sequence, the Fibonacci sequence, in which each number is the sum of the two preceding ones. The sequence commonly starts from 0 and 1, although some authors start the sequence from 1 and 1 or sometimes (as did Fibonacci) from 1 and 2. Starting from 0 and 1, the first few values in the sequence are:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144…….



A tiling with squares whose side lengths are successive Fibonacci numbers: 1, 1, 2, 3, 5, 8, 13 and 21.

The Fibonacci numbers were first described in Indian mathematics,[2][3][4] as early as 200 BC in work by Pingala on enumerating possible patterns of Sanskrit poetry formed from syllables of two lengths. They are named after the Italian mathematician Leonardo of Pisa, later known as Fibonacci, who introduced the sequence to Western European mathematics in his 1202 book Liber Abaci.

Fibonacci numbers appear unexpectedly often in mathematics, so much so that there is an entire journal dedicated to their study, the Fibonacci Quarterly. Applications of Fibonacci numbers include computer algorithms such as the Fibonacci search technique and the Fibonacci heap data structure, and graphs called Fibonacci cubes used for interconnecting parallel and distributed systems. They also appear in biological settings, such as branching in trees, the arrangement of leaves on a stem, the fruit sprouts of a pineapple, the flowering of an artichoke, an uncurling fern, and the arrangement of a pine cone's bracts.

Fibonacci numbers are also strongly related to the golden ratio: Binet's formula expresses the nth Fibonacci number in terms of n and the golden ratio, and implies that the ratio of two consecutive Fibonacci numbers tends to the golden ratio as n increases. Fibonacci numbers are also closely related to Lucas numbers, which obey the same recurrence relation and with the Fibonacci numbers form a complementary pair of Lucas sequences.

The Fibonacci numbers may be defined by the recurrence relation,

$$F_0 = 0, \quad F_1 = 1,$$

And,

$$F_n = F_{n-1} + F_{n-2}$$

Under some older definitions, the value F0=0 is omitted, so that the sequence starts with F1=F2=1, and the recurrence Fn=Fn-1+Fn-2 is valid for n > 2.

The Fibonacci spiral: an approximation of the

The first 20 Fibonacci numbers Fn are:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181.

The Fibonacci Retracements

The topic of Fibonacci retracements is quite intriguing. To fully understand and appreciate the concept of Fibonacci retracements, one must understand the Fibonacci series. The origins of the Fibonacci series can be traced back to the ancient Indian mathematic scripts, with some claims dating back to 200 BC. However, in the 12th century, Leonardo Pisano Bogollo, an Italian mathematician from Pisa, known to his friends as Fibonacci discovered Fibonacci numbers.

The Fibonacci series Is a sequence of numbers starting from zero arranged so that the value of any number in the series is the sum of the previous two numbers.

The Fibonacci sequence is as follows:

0 , 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610…

Notice the following:

233 = 144 + 89

144 = 89 + 55

89 = 55 +34

Needless to say, the series extends to infinity. There are few interesting properties of the Fibonacci series.

Divide any number in the series by the previous number; the ratio is always approximately 1.618.

For example:

610/377 = 1.618

377/233 = 1.618

233/144 = 1.618

The ratio of 1.618 is considered as the Golden Ratio, also referred to as the Phi. Fibonacci numbers have their connection to nature. The ratio can be found in the human face, flower petals, animal bodies, fruits, vegetables, rock formation, galaxy formations etc. Of course, let us not get into this discussion as we would be digressing from the main topic. For those interested, I would suggest you search on the internet for golden ratio examples, and you will be pleasantly surprised. Further into the ratio properties, one can find remarkable consistency when a number is in the Fibonacci series is divided by its immediate succeeding number.

For example:

89/144 = 0.618

144/233 = 0.618

377/610 = 0.618

At this stage, do bear in mind that 0.618, when expressed in percentage is 61.8%.

Similar consistency can be found when any number in the Fibonacci series is divided by a number two places higher.

For example:

13/34 = 0.382

21/55 = 0.382

34/89 = 0.382

0.382, when expressed in percentage terms, is 38.2%

Also, consistency is when a number in the Fibonacci series is divided by a number 3 place higher.

For example:

13/55 = 0.236

21/89 = 0.236

34/144 = 0.236

55/233 = 0.236

0.236, when expressed in percentage terms, is 23.6%.

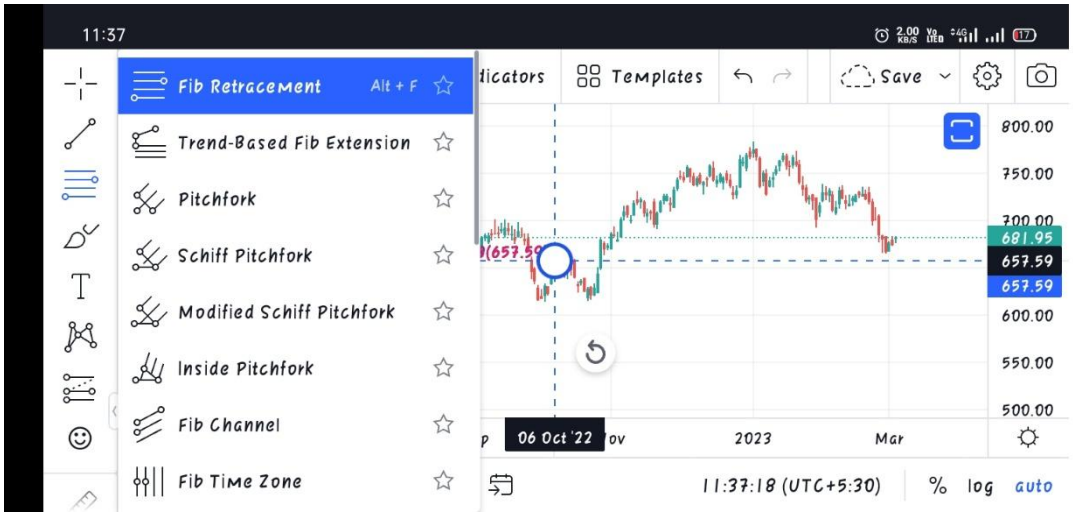
Fibonacci Retracement construction

As we now know, Fibonacci retracements are movements in the chart that go against the trend. To use the Fibonacci retracements, we should first identify the 100% Fibonacci move. The 100% move can be an upward rally or a downward rally. To mark the 100% move, we need to pick the most recent peak and trough on the chart. Once this is identified, we connect them using a Fibonacci retracement tool.

Here Is a step by step guide:

Step 1) Identify immediate peak and trough. In this case, the trough is at 516, and the peak is at 782. The 266 point moves make it 100%.

Step 2) Select the Fibonacci retracement tool from the chart tools



Step 3) Use the Fibonacci retracement tool to connect the trough and the peak.

After selecting the Fibonacci retracement tool from the charts tool, the trader has to click on trough first, and without un-clicking, he has to drag the line till the peak. While doing this, simultaneously, the Fibonacci retracements levels start getting plotted on the chart. However, the software completes the retracement identification process only after selecting both the trough and the peak. This is how the chart looks after selecting both points.

Relevance to stocks markets

It is believed that the Fibonacci ratios, i.e. 61.8%, 38.2%, and 23.6%, finds its application in stock charts. Fibonacci analysis can be applied when there is a noticeable up-move or down-move in prices. Whenever the stock moves either upwards or downwards sharply, it usually tends to retrace back before its next move. For example, if the stock has run up from Rs.50 to Rs.100, it is likely to retrace back to probably Rs.70 before moving Rs.120.

'*The retracement level forecast*' is a technique that can identify upto which level retracement can happen. These retracement levels provide a good opportunity for the traders to enter new positions in the trend direction. The Fibonacci ratios, i.e. 61.8%, 38.2%, and 23.6%, help the trader identify the retracement's possible extent. The trader can use these levels to position himself for trade.

Have a look at the chart below:

I've encircled two points on the chart, at Rs.380 where the stock started its rally and at Rs.489, where the stock prices peaked.

I would now define the move of 109 (380 – 489) as the Fibonacci upmove. As per the Fibonacci retracement theory, after the upmove one can anticipate a correction in the stock to last up to the Fibonacci ratios. For example, the first level up to which the stock can correct could be 23.6%. If this stock continues to correct further, the trader can watch out for the 38.2% and 61.8% levels.

Notice in the example shown below, the stock had retraced up to 61.8%, which coincides with 421.9, before it resumed the rally.

We can arrive at 421 by using simple math as well –

Total Fibonacci up move = 109

61.8% of Fibonacci up move = 61.8% * 109 = 67.36

Retracement at 61.8% = 489- 67.36 = 421.6

Likewise, we can calculate for 38.2% and the other ratios. However one need not manually do this as the software will do this for us.

Here is another example where the chart has rallied from Rs.288 to Rs.338. Therefore 50 points move makes up for the Fibonacci upmove. The stock retraced back 38.2% to Rs.319 before resuming its up move.

The Fibonacci retracements can also be applied to falling stocks to identify levels upto which the stock can bounce back. In the chart below, the stock started to decline from Rs.187 to Rs. 120.6 thus making 67 points as the Fibonacci down move.

After the down move, the stock attempted to bounce back retracing back to Rs.162, which is the 61.8% Fibonacci retracement level.

Some Relevant Examples of Fibonacci Retracement

-Oil India limited: **(upward)**

This is chart of *OIL* of December 2022, here the chart had rally from Rs.64 to Rs.305. Therefore 241 points make Fibonacci upmove and stock retraced back to 61.8%-50% to Rs.168

Now, here after Retracement stock is in up move and from Rs.168 it goes on Rs.214 in mid of the December and if we take the chart of *OIL* of March 2023,

Stock has moved to Rs.256. If I had entered in the stock of *OIL* @Rs. 183 and my stoploss would be Rs.154 I will able to get 73 points in atleast three months

-*JSWSTEEL:*(upward)

In *JSWSTEEL* Fib Retracement is in upmove from Rs.522 to Rs.701 and gives the rally of 179 points and stock retraced back to 50% to Rs.611

After Retracement stock was in upmove from Rs.611 to Rs.701 and further to Rs.780 and if I am smart trader then I will enter in *JSWSTEEL* @Rs. 632 and my stoploss would be Rs. 611 because stock were retraced twice at the same price , without any greed I will put my Target Rs. 700. It went increasing further as we can see now, but I didn't knew it will increase or not at that time when it will achieve my Target so I will book my profit @ Rs. 700 , atleast 68 points in one month.

***Tata steel:* (downward)**

Here as I take data from january 2023, I might think tata steel was in upmove and it were retracing back but as you see in below chart, on 6 February 2023 there is big fall with big volume and fall further. The big fall were happening because of the Q3 results of Tata steel. Tata steel had reported a loss of Rs. 2224 crore for the third quarter ending 31 December, 2022. Now if my observations is clear I can also predict how further Tata steel will fall. Now in the below chart there is downtrend and if I draw fib Retracement in downward I can also find Retracement in it.

Now,as I draw fib Retracement in downward, in below chart, from Rs.124 to Rs. 108 and giving the rally of 16 points and retraced back to Rs. 114 to 38.2%.

After Retracement stock was in strong downmove and volumes with above average.

From this information I can also invest my money in future and option (F&Os) of the Tata steel.

Tata motors **: (downward)**

In Tata motors fib Retracement is in downmove from Rs.495 to Rs.392 giving total rally of 103 in downward direction and retraced back to Rs.444 to 50% and again goes back in downward direction, from Rs. 444 to Rs. 392 again. If I short sell or buy put option of the Tata motors I will make profit of 50 points, and also I can sell call option of the Tata motors over falling stock price.

How should you use the Fibonacci retracement levels?

Think of a situation where you wanted to buy a particular stock, but you have not been able to do so because of a sharp run-up in the stock. The most prudent action to take would be to wait for a retracement in the stock in such a situation. Fibonacci retracement levels such as 61.8%, 38.2%, and 23.6% act as a potential level upto which a stock can correct.

By plotting the Fibonacci retracement levels, the trader can identify these retracement levels, and therefore position himself for an opportunity to enter the trade. However please note like any indicator, use the Fibonacci retracement as a confirmation tool.

I would buy a stock only after it has passed the other checklist items. In other words, my conviction to buy would be higher if the stock has:

1) **Formed a recognizable candlestick pattern**
2) **The stoploss coincides with the S&R level.**
3) **Volumes are above average.**

Along with the above points, if the stoploss also coincides with the Fibonacci level, I know the trade setup is well aligned to all the variables, and hence I would go in for a strong buy. The word 'strong' usage indicates the level of conviction in the trade set up. The more confirming factors we use to study the trend and reversal, more robust is the signal. The same logic can also be applied for the short trade.

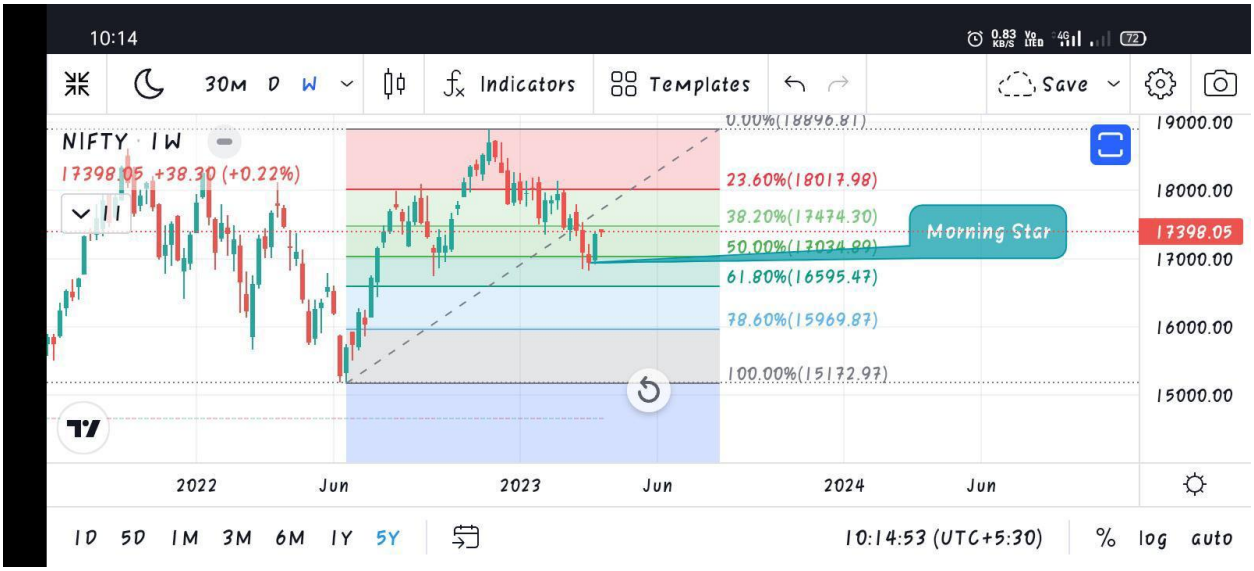
Confirmation and Entry

Taking entry in any particular stock with Fibonacci Retracement level we need to know confirmation candle or candlestick pattern. For that we should have some knowledge of Japanese candlestick pattern, like Doji, Hammer ,Morning Star, Evening Star, Harami , Engulfing etc. We should also know the price action Trading like triangle pattern, head and shoulders pattern, double top double bottom etc. Some examples of confirmation are below

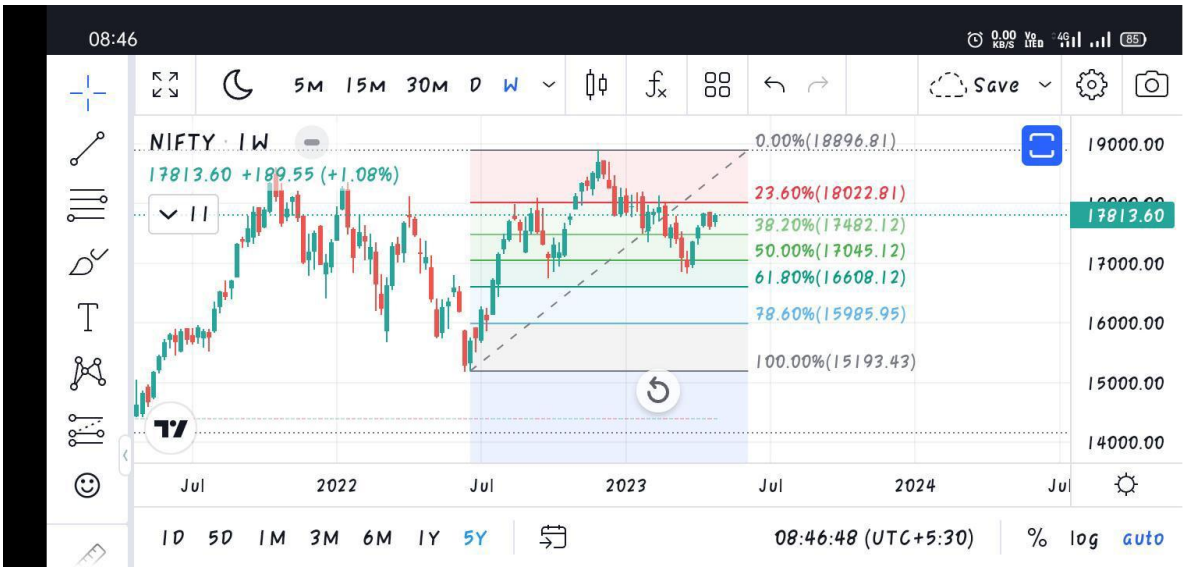
1) **Bullish harami**

After formation of Bullish harami at 38.2% area Nifty of weekly candle goes back to its Previous high

2) Morning star



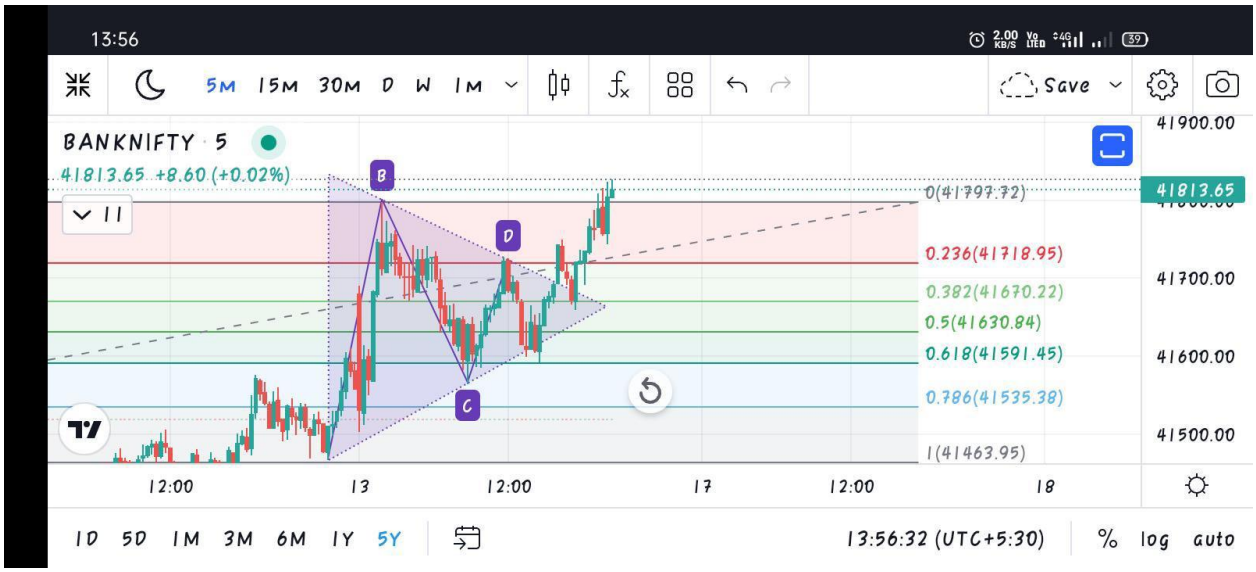
After formation of Morning star at 61.8% area Nifty weekly candle trying to go back again to its previous high, and we can see it in below chart that Nifty were break 38.2% level and it will going back to previous high



3) head and shoulders pattern

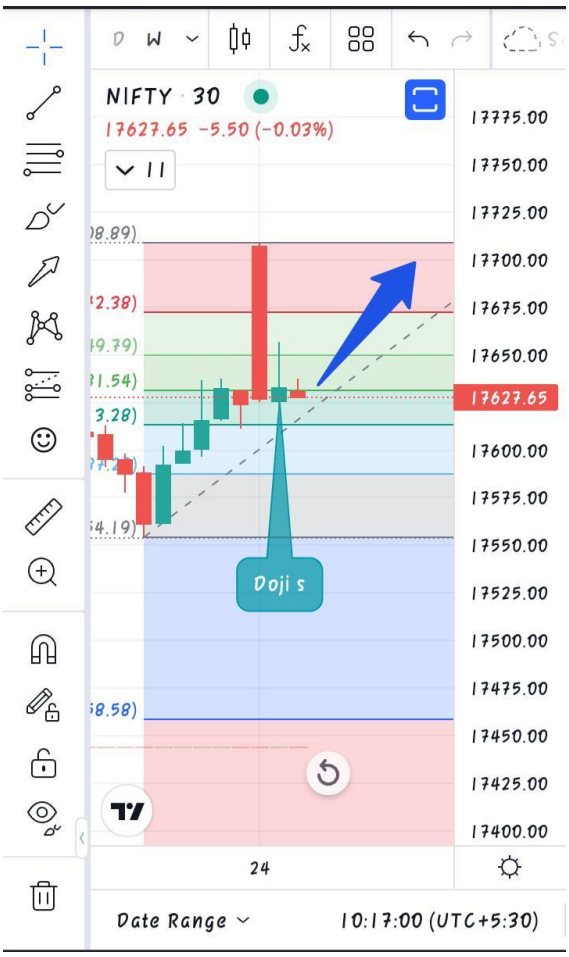
After formation of head and shoulders pattern at 50% level Nifty goes back to its previous high as we can see it in below chart

4) Triangle pattern



Here in Banknifty we can see the formation of triangle pattern at Retracement levels and after 5 min candle break triangle in upside it goes back to its previous high. Also after breaking the previous high in chart below Banknifty was unstoppable.

5) **Doji star**



Here we can see how doji star and Fibonacci Retracement level works to get better confirmation and gives you better understanding of market trend .

To get entry in trending market we should have more confirmations, and Fibonacci Retracement levels are one of them. Along with Fibonacci Retracement levels we have to use other confirmation like all the above and more to get better profits.