Where is the cue ball going?

OK
So let us assume that when your cue tip hits the cue ball:
a) your cue follows through in a straight line
b) you don't grab the cue in a vain effort to avoid a miscue
c) you don't twist the cue in the direction of the spin in a vain attempt to exaggerate that spin.

1)Hitting high on the cue ball:
you think that the cue ball spins in a forward direction and continues to spin as such;
WRONG! The cue ball might 'chirp' on the cloth, but it immediately stops spinning and continues to roll normally

2)Hitting centre on the cue ball:
you think that the cue ball immediately rolls forward normally;
WRONG! The cue ball slides forward on the cloth until friction stops the slide and it continues to roll forward normally

3) Hitting low on the cue ball:
the cue ball spins in reverse until friction stops the slide and it continues to roll forward normally;
CORRECT! but note that the spin may be gone by the time that the cue ball hits the object ball (this is called drag)

4) So somewhere between hitting HIGH and hitting CENTRE,
logic dictates that there is a spot to hit the cue ball where the cue ball will simply roll forward with the cue tip, resulting in no traumatic force on the cue ball;
CORRECT! this spot lies approximately 2/3 (actually 7/5 times the radius) of the way up the cue ball. Most snooker players call this 'normal topspin' but it isn't. Lets call this 'Natural Roll'. When hit here, the cue ball rolls with no friction between the ball and the cloth. It is also the spot where you can impart maximum top spin on the ball.

So where is that cue ball going after it hits the object ball?

1) If neither cue ball not object ball is rotating when they meet, then the cue ball will take a path 90 degrees to the path that the object ball takes.
This is counter-intuative, but if you played on a table with no friction e.g. a glass surface, it would be obvious.

2) If the cue ball is rotating in a forward motion i.e. a natural roll, and the object ball is not rotating, i.e. stationary, then the cue ball will initially take a path 90 degrees to the path that the object ball, then will curve towards the direction that the object ball takes.

3) If the cue ball is rotating in a backward motion and the object ball is not rotating, i.e. stationary, then the cue ball will initially take a path 90 degrees to the path that the object ball, then will curve away from the direction that the object ball takes.

4) Note that I have not discussed side spin. Later!

Top/bottom spin off a cushion:

1) If a ball with top spin hits a cushion, it will slide slightly off the cushion and the top spin will take effect.

2) If a ball with bottom spin hits a cushion, it will check up slightly off the cushion and the bottom spin will take effect.

The effects of side spin:

1) Side spin has no effect when the cue ball rebounds from the object ball except at very low speeds or if you also drive the cue ball into the cloth.

2) The MAJOR effect of side spin occurs when a side spinning ball rebounds from a cushion.

3) At very slight angles, check side on a cue ball will cause the cue ball to 'slide' on the cushion, effectively narrowing the angle that the cue ball will rebound off the cushion.

4) Conversely at very slight angles, running side on a cue ball will cause the cue ball to 'kick' off the cushion, effectively widening the angle that the cue ball will rebound off the cushion.

5) When a cue ball is hit WITH THE NAP with:
   a)running side then it will first jump away from the point of contact of the cue, and will then curve back towards it.
   b)check side then it will first jump away from the point of contact of the cue, and will then curve back towards it.

6) When a cue ball is hit AGAINST THE NAP with:
   a)running side then it will first jump away from the point of contact of the cue, and will then curve away from it.
   b)check side then it will first jump away from the point of contact of the cue, and will then curve away from it.

CONCLUSIONS:

1) A cue ball that is not rolling will rebound off an stationary object ball at 90 degrees;
   This is obvious when you watch the pros: they sink a Red, then get above the Blue;
   They hit the cue ball onto the blue so that it is not rotating when it strikes the blue and the cue ball rebounds into the Pink, spreading the pack;

   Want to hit the far side of the pack instead of the Pink? Add a little top.

   Want to hit the near side of the pack instead of the Pink? Add a little bottom.

2) If the cue ball is NOT going to hit a cushion, then DON'T use side.

3) Forget how you THINK that the cue ball reacts when rebounding from an object ball with side spin.

4) Learn how top spin and bottom spin react when rebounding fom a cushion.

5) Don't use side unless there is no option;
   Talking to the older pool players in New York, I learned that if you must hit side spin, never go further that a tip width from the centre of the cue ball (I know that most training sites show that the point to hit is at the extreme edge of the cue ball, but that just exaggerates the throw and minimises the contact area between the cue tip and the ball)

   Top, left and right side spin are maximised if you hit within a cue tip of the centre of the cue ball and hit SLOWLY within a cue tip of the centre of the ball.

   Bottom spin can go further from centre because the mass of the cue ball will keep it down, but with moderation.

   So maximise the tip-to-ball contact area, hit softly, let the weight of the cue do the work, and watch the cue ball react! MAGIC!

Aiming ahead:

Question: How many balls do you think ahead?

Answer: 3

First priority (ball):
Sink the ball that you are aiming at.

Second priority (ball):
Get the cue ball in a position to pot the next ball.

Third priority (ball):
Get on the correct side of that second priority ball so that you have choices.