

PRESENT

# 2013 IAP POKER QUALIFIER TOURNAMENT

*No Entry Fee*

*Earn Points for Poker Class*

*Qualify for MIT Series of Poker Main Event*

Thursday January 17th **1pm**  
Baker Dining H

Drop your resumé online

<http://poker.scripts.mit.edu/resume.htm>

# 2013 MIT SERIES OF POKER MAIN EVENT

(Invite Only\*)

- 1st Place: iPad
- 2nd Place: Xbox + Kinect
- 3rd Place: Kindle Fire
- 4th Place: SIG Poker Set
- 5th - 10th Place:

Signed copy of The Mathematics of Poker

Refreshments and Dinner provided

Saturday January 19th **1pm**  
Baker Dining Hall

Bring your resumé

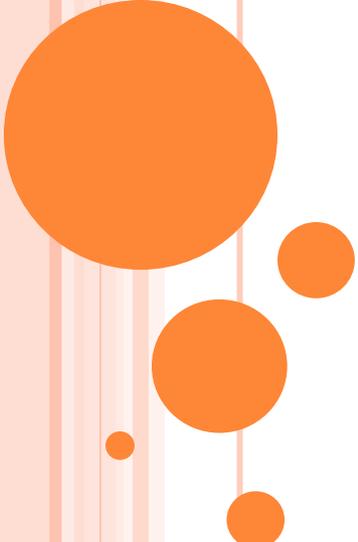
\*Invitation through Qualifier tournament on January 17th

Featuring

Bill Chen



*Two time  
World Series of Poker Champion*



# MIT 15.S50 LECTURE 2

Wednesday, January 16<sup>th</sup>, 2013

# OUTLINE: POSTFLOP PLAY

- 1<sup>st</sup> Half: Continuation Betting, Fundamental Theorem of Poker, Flop Analysis
- 2<sup>nd</sup> Half: Implied Odds, Set Mining, Bluffing (with draws), Bluffing Epiphany 1, Bluffing Epiphany 2



## A REMINDER ABOUT ATTENDANCE...

- YOU are responsible for ensuring your attendance is marked down each class!
- Find the Attendance Person with your name either before class, during the break, or after class. I won't set aside class time for attendance.



# REMINDER: LIVE TOURNAMENT TOMORROW

- 1PM, will end around 5PM if you make it until the very end.
- Baker House Dining.
  - Baker House is an Undergrad dorm.
  - Google Maps it.
  - The front door is locked, but if you tell the secretary you're here for the poker tournament, they'll let you in.)



# ALRIGHT, LET'S TALK ABOUT SOME POSTFLOP PLAY. NOTE POSITION NAMES.





# BOTH BLINDS CALL.



# SB CHECKS





## CHECKING TO THE PREFLOP RAISER

- This is conventional. The SB and BB, regardless of what cards they have, will usually check to the preflop raiser.
- Why is this?
- The SB and BB cannot really threaten to ever have a big pair on this flop, because if they had AA, they would've re-raised preflop.
- On the other hand, HJ-1 could potentially have AA in this situation.
- So if the SB and BB bet, they leave themselves susceptible to get raised by HJ-1, and they'll usually have to fold, since HJ-1 could have/threaten AA while they can't.



# HOW BIG TO BET?

LEAVE TABLE  
VIEW LOBBY

UTG+1  
\$2000

HJ-2  
\$2000

UTG  
\$2000

HJ-1  
\$1675

9♣ 2♦ 8♠

\$100  
\$200

\$375

BB  
\$1875

HJ  
\$2000

SB  
\$1875

CO  
\$2000

BTN  
\$2000

Chat Notes Stats Info

Last Action  
HJ-1 bets 200\$



## SAME “SWEET SPOT” PRINCIPLES...

- Betting small always allows your opponents to call profitably.
- Betting big risks a lot.
- Good rule of thumb: bet half the pot on the flop. Slightly bigger % of the pot on the turn. Even bigger % of the pot on the river.



# CONTRADICTION?

- This slightly goes against what we said last class about being able to bet smaller on the turn because your opponent has worse equity with their bad hands.
- However, on the turn and river, they have the advantage of having to call fewer streets in the future.
- With a marginal hand, they have additional incentive to fold to a flop bet, because you can threaten to bet again on the turn and river. They may just call your river bet.
- We didn't mention this last class.





## “CHECK-RAISING”

- Betting small never forces your opponent to fold, but even worse, it gives them the opportunity to check-raise!
- You just denied yourself the chance to see a turn card and potentially hit one of your 6 cards.
- Remember – just because they checked doesn't mean they have bad hands! They're often checking REGARDLESS of what they have, for reasons I described earlier.





# COMPARISON

- Advantages of Betting 200:
  - Don't give some "garbage" like KJ a chance to outdraw you
- Advantages of Checking:
  - See the turn card for sure; no risk of getting check-raised.
  - When you bet, you are only called by hands that beat you.





# COMPARISON

- Advantages of Betting 200:
  - Don't give some "garbage" like KJ a chance to outdraw you.
  - **Get hands like AJ, A7 to fold!**
- Advantages of Checking:
  - See the turn card for sure; no risk of getting check-raised.
- The correct play is **clearly to bet 200.**



# NOW CHANGE OUR KING TO A QUEEN...



# COMPARISON

- Advantages of Betting 200:
  - Don't give some "garbage" like KJ a chance to outdraw you.
  - **Get worse hands like 55, T9, A8 to call you!**
- Advantages of Checking:
  - Essentially none.
- The correct play is **clearly to bet 200.**



# FUNDAMENTAL THEOREM OF POKER

- With the top hands in your range, you should bet, to get them to call worse (but still good) hands
- With the bottom hands in your range, you should bet, to get them to fold better (but still weakish) hands
- With the middle hands in your range, you should check, because by betting you fold out all weaker hands and keep in all stronger hands



AQ IS STILL A BIT WEAK ON THAT FLOP, SO I SAID BETTING IS FINE. BUT SAY WITH 77, YOU SHOULD DEFINITELY CHECK.



# ANOTHER TIP: DON'T BLUFF SCARY-AS-HELL FLOPS, EVEN IF YOU HAVE COMPLETE TRASH



# DON'T TRY TO BLUFF $\geq 3$ PEOPLE, EVEN IF THE FLOP LOOKS SAFE



# CHECK-POINT

- We just learned:
  - General theory of when to bet postflop.
  - How big you should be betting postflop (half pot-ish).
- Now let's look a bit at calling bets postflop...too many people are calling with hands way too weak!
- Unless your opponent bets extremely small (which they should not do), you should fold **MOST** of your hands to a half-pot bet.



# SITUATION: EVERYONE FOLDS TO BTN, WHO RAISES TO 125



# SB FOLDS, BB CALLS 75



# BB CHECKS FLOP

LEAVE TABLE  
VIEW LOBBY

UTG+1  
\$2000

HJ-2  
\$2000

UTG  
\$2000

HJ-1  
\$2000

10♦ 7♥ 2♥

Q♣ 9♣

Check

\$275

HJ  
\$2000

SB  
\$1975

CO  
\$2000

BTN  
\$1875

Chat Notes Stats Info

Last Action  
BB checks



BTN BETS HALF-POT. IF YOU'VE GOT NO PAIR NO DRAW, JUST **FOLD**...



# FOLD (ACE HIGH ON SCARY BOARD)



# FOLD (ACE-HIGH ON SCARY BOARD)



# FOLD (BOTTOM PAIR ON 3-HEART BOARD)





# FOLD (8-OUT STRAIGHT DRAW, BUT THOSE OUTS ALL SUCK)





# IN THESE “FOLD” SPOTS, WHAT IF I THINK BLUFF-RAISING WILL WORK?

- When you are bluffing on the flop, it's usually because you have some kind of draw, that has a small % chance of turning into a very good hand
- In all of the above hands, we basically had complete junk, without any draws, so we should ALWAYS just fold



# CALL (ACE-HIGH ON PAIRED BOARD)



# CALL (BOTTOM PAIR ON SAFE BOARD)



# CALL (SECOND PAIR ON SCARY BOARD)



# CALL (SECOND PAIR ON SAFE BOARD)



# CALL (GOOD PAIR)



# CALL (TOP PAIR WEAK KICKER)



# CALL (TOP PAIR TOP KICKER ON SCARY BOARD.)



# CALL (SMALL OVERPAIR)



## NOTE

- NONE of these “Call” hands are good enough to raise!
- If you raise, you give BTN an opportunity to re-raise all-in, and you either have to fold a good hand, or call and have your hand not be good enough – both terrible situations.
- By calling, you keep the pot size under control, with your medium-strength hands.
- On a similar note, with these “call” hands, if he keeps betting (turn + river), assuming you don’t improve by the river, you should fold by the river!



## ANOTHER NOTE

- You could argue for check-raising in some of these Call situations, especially the ones where your hand was more vulnerable to overcards.
- Since by just calling, you are giving your opponent at least 6 outs to pair their hand.
- However, vs. most opponents, the advantages of calling still outweigh the advantages of raising.
- Especially when, say in the A3 hand, an Ace could turn, and you could win a LOT of money vs. AK.



# JUST HOW GOOD DOES MY HAND HAVE TO BE TO RAISE!?

- A reasonable rule or thumb is: raise whenever you have two-pair or better.



OF COURSE, THIS DOESN'T COUNT AS TWO-PAIR...



# THIS TWO-PAIR IS COMPLETE TRASH...



AS IS THIS...



# RAISE (DREAM SITUATION...)



# RAISE (ANOTHER 3-OF-A-KIND; ALTHOUGH YOU COULD JUST CALL)





# RAISE (BABY FLUSH, MUST RAISE)



# RAISE (STRAIGHT ON SCARY BOARD)



# RAISE (TWO PAIR)



# DO I REALLY NEED SUCH A GOOD HAND TO PUT ALL 40BB IN?

- There are some situations when your one-pair hand is good enough.



RAISE (IF YOU DIDN'T RAISE AA  
PREFLOP...AGAIN YOU COULD JUST CALL THE  
FLOP TOO)







WHEN YOU HAVE ONLY 25BB, ANY TOP PAIR (OR OVERPAIR) IS USUALLY GOOD ENOUGH



# RAISE TO 350 AND BE PREPARED TO GO ALL-IN!





# SAME THING AGAIN!



BREAK...





# DO THE MATH

- Need to call 2BB to win 5.5BB already in the pot
- $2/7.5 = 27\%$  equity needed
- Assume he's raising top 25 percent of hands (see right)

- Your equity with 72o is 28%

Player 1	$\frac{R}{D}$	66+, A2s+, K6s+, Q8s+, J8s+, T8s+, A7o+	71.989%
Player 2	$\frac{R}{D}$	72o	28.011%

- Enough to call!

AA	AKs	AQs	AJs	ATs	A9s	A8s	A7s	A6s	A5s	A4s	A3s	A2s
AKo	KK	KQs	KJs	KTs	K9s	K8s	K7s	K6s	K5s	K4s	K3s	K2s
AQo	KQo	QQ	QJs	QTs	Q9s	Q8s	Q7s	Q6s	Q5s	Q4s	Q3s	Q2s
AJo	KJo	QJo	JJ	JTs	J9s	J8s	J7s	J6s	J5s	J4s	J3s	J2s
ATo	KTo	QTo	JTo	TT	T9s	T8s	T7s	T6s	T5s	T4s	T3s	T2s
A9o	K9o	Q9o	J9o	T9o	99	98s	97s	96s	95s	94s	93s	92s
A8o	K8o	Q8o	J8o	T8o	98o	88	87s	86s	85s	84s	83s	82s
A7o	K7o	Q7o	J7o	T7o	97o	87o	77	76s	75s	74s	73s	72s
A6o	K6o	Q6o	J6o	T6o	96o	86o	76o	66	65s	64s	63s	62s
A5o	K5o	Q5o	J5o	T5o	95o	85o	75o	65o	55	54s	53s	52s
A4o	K4o	Q4o	J4o	T4o	94o	84o	74o	64o	54o	44	43s	42s
A3o	K3o	Q3o	J3o	T3o	93o	83o	73o	63o	53o	43o	33	32s
A2o	K2o	Q2o	J2o	T2o	92o	82o	72o	62o	52o	42o	32o	22

# SAME SITUATION EXCEPT YOU HAVE MORE CHIPS...



# INTRODUCING REVERSE IMPLIED ODDS

- In the first situation, we called because we were all-in and the equity calculation (which assumes that players are all-in) said we could call with 5.5-to-2 odds.
- In this situation, even though pot odds tell us to call, the correct play is clearly to **fold**.
- The reason is because, the hand is not over the moment you call. You still have to play the flop, turn, and river. With a hand like 72o, it is going to be extremely difficult to play postflop. You are often going to fold the best hand, or put in more chips with the worse hand, which makes your 28% equity less relevant.
- We say that in this situation your actual odds are worse than 5.5-to-2 due to **reverse implied odds**.



# SAY YOU HAD A20...



# REVERSE IMPLIED ODDS ARE VERY IMPORTANT!

- I would still fold in this situation! Even though your equity against his range is 43%, and you only need 27% equity to all-in profitably.
- You will often lose a lot of money when he has a stronger ace and an ace comes.
- You will often get bluffed off a pair of deuces, when there are 4 higher cards on the board.
- To make things worse, you are out of position the entire hand. You have to act first on the flop, turn, and river, which causes you to make even more postflop mistakes.





# REVERSE IMPLIED ODDS DON'T WORK AGAINST YOU HERE

- Even though your equity is worse than with A2o, I could call instead of fold, because you will be able to make much better decisions with your remaining 60,000 chips.
- You can hit a straight, and get him to put in lots of money with a good pair.
- You can hit a flush, and get him to put in lots of money with a good pair.
- When you hit a 9 or a 8, it's harder to bluff you off the hand than if you had a pair of deuces, because there will be fewer cards on the board higher than 9 or 8.
- Yes, you are still out of position, but whatever.



# IMPLIED ODDS

- Sometimes, reverse implied odds can work in your favor! In this situation, we say that you have **implied odds**.
- This can happen when you have a hand that plays well postflop (suited connectors, pairs), and you are in position.





# ANALYSIS

- You need to put in 3BB, with 5.5BB already in.
- You need  $3/8.5 = 35\%$  equity.
- However, you only have 34% equity:
- I would **definitely still Call**:

Player 1	R/D	88+,AJs+,KQs,AQo+	65.689%
Player 2	R/D	22	34.311%

  - You are in position.
  - You can win a huge pot vs. AA on a 752 flop.
  - You can win a huge pot vs. AK on a A62 flop.
  - Even though you will lose the pot most of the time, you will rarely lose a big pot.
  - You will flop a deuce (flop a “set”) 1/8 of the time.
  - We say that you are “set mining”.
- Note: You need a LOT of chips (effective stack size >50BB) for this to be a good play. Even with 30BB, it’s sketchy.



# ANOTHER HAND

LEAVE TABLE  
VIEW LOBBY

UTG+1  
\$55878

HJ-2  
\$6685

UTG  
\$79900

HJ-1  
\$16155

BB  
\$61600

HJ  
\$48654

SB  
\$4036

CO  
\$29900

BTN  
\$79900

Chat Notes Stats Info

Last Action  
CO raises to 2000\$

Position	Stack Size
UTG+1	\$55878
UTG	\$79900
BB	\$61600
SB	\$4036
CO	\$29900
HJ	\$48654
HJ-1	\$16155
HJ-2	\$6685
BTN	\$79900

CALL. WE HAVE IMPLIED ODDS (AND HAVE ENOUGH EQUITY ANYWAYS...)



# BOTH BLINDS FOLD AND CO

## “CONTINUATION BETS”

LEAVE TABLE  
VIEW LOBBY

UTG+1 \$55878

HJ-2 \$6685

UTG \$79900

HJ-1 \$16155

BB \$61600

HJ \$48654

SB \$4036

CO \$27150

BTN \$77900

Chat Notes Stats Info

Last Action  
CO bets 2750\$

Board: A♦ 5♠ 2♦  
Pot: \$6100  
Blinds: \$2500 / \$5000  
CO bet: \$2750  
BTN hand: J♦ 10♦







# ANALYSIS

- Let's assume that CO has at least a pair of Aces when he bets again, and bets this big. Let's assume that we win if and only if we hit a diamond on the river.
- We need to call 8000 to win 20000 already in the pot.
- $8/28 = 29\%$  equity is what we need
- # of diamonds left = 9. # of total cards left = 46.
- $9/46 = 20\%$  equity is what we have – not enough!
- However, I would definitely still **call**. Because when you hit your flush, you actually win more than 20000: you win 20000 + the money to go in on the river, which could be up to another 20000.
- So we say that you call because of **implied odds**.



# THE SAME SCENARIO WITH DIFFERENT CARDS...



## HERE, YOU DON'T REALLY HAVE IMPLIED ODDS TO CALL

- When you do hit the 4<sup>th</sup> diamond, the board will have 4 diamonds on it, and it will be sort of “obvious” that you have a flush when you bet. He will only call with a decent diamond (Td, 9d), which he is not that likely to have. So your “implied odds” are a lot worse.
- You're not even drawing to the best hand. When the board has 3 diamonds and you have a J-high flush, you're only beaten by the Qd or Kd **with another diamond**. Here, you're beaten by the naked Qd or Kd.
- Also remember, on paired boards, flushes can be beaten by full houses! (Whereas on non-paired boards, flushes are unbeatable.)



## BLUFFING WITH DRAWS

- So far, we've played all of our draws passively – that is, we either fold if we don't have the implied odds, or call if we have the implied odds and try to hit our flush.
- However, draws are very potent when you play them aggressively. In fact, “bluffing” is equivalent to “raising aggressively with a draw”. You should **VERY RARELY** be bluffing (before the river) without a draw.



# EXAMPLE

LEAVE TABLE  
VIEW LOBBY

UTG+1  
\$5878

HJ-2  
\$6685

UTG  
\$7554

HJ-1  
\$16155

BB  
\$15200

HJ  
\$8654

SB  
\$6036

CO  
\$2443

BTN  
\$12400

Chat Notes Stats Info

Last Action  
BTN raises to 1600\$







# HE CONTINUATION BETS.

A screenshot of a poker hand in progress. The community cards are the Jack of Clubs, 8 of Hearts, and 5 of Hearts. The pot is \$4500. The button player (BTN) has bet 2500\$. The flop is Jc 8h 5h. The stack sizes for the players are: UTG \$7554, UTG+1 \$5878, HJ-2 \$6685, HJ-1 \$16155, HJ \$8654, CO \$2443, and BTN \$9900. The blinds are \$14400 (BB) and \$6036 (SB). The hand is in the middle of the flop. The button player has bet 2500\$. The last action is "BTN bets 2500\$".

LEAVE TABLE  
VIEW LOBBY

UTG+1  
\$5878

HJ-2  
\$6685

UTG  
\$7554

HJ-1  
\$16155

Jc 8h 5h

BB  
\$14400

HJ  
\$8654

SB  
\$6036

CO  
\$2443

BTN  
\$9900

Chat Notes Stats Info

Last Action  
BTN bets 2500\$





## WHY DID WE DO THIS INSTEAD OF CALLING AND TRYING TO HIT OUR STRAIGHT?

- When we just call, we can put our money in when we hit, and not put our money in when we miss...why did we raise all-in instead with ten high!???
- The thing is, it doesn't matter that we have ten-high. He is never calling our all-in with a naked Queen high or King high or Ace high. What's important, is we have **8 outs** (or more) against hands he calls with, ie. hands with Jacks (or better). We have 8 outs even if he has JJ!
- Compare this to say 65 on this flop. Even though we have a pair, we actually have fewer outs (**5 outs**) against a pair of jacks, and have close to 0% equity vs. JJ.



## A BLUFFING EPIPHANY

- It doesn't matter how "good" our hand is. It only matters how many "outs" we have against the hands he calls our raise with.
- This is why bluffing with draws is so good! Because draws are hands that suck (ten-high), but have many outs against the good hands in his range.
- On the other hand, a hand like 77 is better to call with instead of raise, since it beats most hands in his range, but loses badly to the ones that call our raise.



## EPIPHANY CONTINUED...

- The next time you make a bluff, instead of thinking “how good is my hand”, count “how many outs do I have against the good hands he could have”?
- How you do vs. his bad hands doesn't matter, because he's folding all of them. That's why bluffing with draws is so good. Draws do relatively well vs. his monster hands (vs. his best possible hand, you still have 8 outs), and relatively poorly vs. his “bad” hands (even vs. Q3, you are losing).



ONLY MAKE BLUFFS WITH DRAWS ON THE FLOP! THIS IS NOT “BLUFFING”...



# WE CALL PREFLOP.





# HE “CONTINUATION BETS”, AS EXPECTED



# WE CHECK-RAISE FOR NO REASON HERE?

LEAVE TABLE  
VIEW LOBBY

UTG+1  
\$3000

HJ-2  
\$3000

UTG  
\$3000

HJ-1  
\$3000

BB  
\$2550

HJ  
\$3000

SB  
\$2985

CO  
\$2790

BTN  
\$3000

Chat Notes Stats Info

Last Action  
BB raises to 360\$

Board: A♥ 8♥ 2♣

BB Hand: 7♦ 6♦

Pot: \$195

BB Stack: \$360

SB Stack: \$2985

CO Stack: \$2790

BTN Stack: \$3000

HJ-1 Stack: \$3000

HJ-2 Stack: \$3000

UTG Stack: \$3000

UTG+1 Stack: \$3000





# WE BET THE TURN WITH ABSOLUTELY NOTHING







# THIS IS “OPENING YOUR WALLET AND GIVING YOUR MONEY TO YOUR OPPONENT”

- You should never be bluffing because “you feel like it”. All big bluffs start with a draw.
- Bluffing is much better when a scary card just came. When the flop is Jack-high, a turned Ace can scare a player off the Jack they called with. When the flop is Ace-high, it’s harder to turn a card that scares them off the Ace they called with.
- The “safe” 3c on the river isn’t a great card to bluff. It’s much harder to bluff someone off an Ace on a board with an Ace, than it is to bluff someone off a Jack on a Jack-high flop with a turned or rivered Ace.





SAME



# WE HAVE FLUSH DRAW, INSTEAD OF NOTHING





SAME





# WE TURN A 15-OUT DRAW





## SOME NOTES

- If CO shoved, we would have odds to call his all-in (we have 15 outs in 46 cards; just barely have enough odds).
- Note that by check-raising flop, betting turn, we give ourselves the chance to put all our money in on the river without ever having to bet absurdly big. So we give ourselves a chance to double up without having to do weird bet sizing.
- You should usually play draws this way because this is how you would play your good hands (say 22) on this board.



RIVER IS KC; SLIGHTLY SCARIER THAN 3C  
BECAUSE WE CAN REPRESENT QT









# CO BETS



# GOTCHA WITH THE CHECK-RAISE!



# ANALYSIS

- We have 4 outs to hit the nuts (8's), 3 outs to hit a higher pair than the 10, 3 outs to hit a lower pair than the 10
- Furthermore, we have lots of back-door draws...
- If we turn a heart, now we have a flush draw
- If we turn a Queen, we have an 8-out straight draw. If we turn a King, we ALSO have an 8-out straight draw (“double-gutter”)!
- Notice that we can hit combinations of these cards. Eg. Qh. This is what makes back-door draws so relevant.



# HJ-1 GETS OUT OF THE WAY







# ANALYSIS

- This card does not help us at all.
- Furthermore, this card is very “safe”. It doesn’t really put his pair of Tens, or pair of Queens, or whatever, in jeopardy. If he called with a 7 on the flop, he now improved to 3-of-a-kind.
- A huge issue – we cannot have a 7 here! With a 7, we’d just call the flop, by the principle of “call medium hands, raise strong hands and draws, fold everything else”.
- We stop our bluff here. He’s not going to fold much if he knows we can’t have a 7.





AND FOLD.



## BLUFFING EPIPHANY 2

- Other than counting how many outs we have, it's important to analyze **what we are representing**.
- When a 7 comes and we cannot represent a 7 by our flop play, this is a bad spot to bluff.
- An Ace-turn would be better to bluff because it is scary; also we can represent AJcc, A8dd, etc.
- A 6-turn would be alright to bluff too because we can represent 98.
- When you were bluffing (with a draw) and a **different draw completes**, this is usually a good opportunity to bluff.



# SUMMARY: POSTFLOP PLAY

- 1<sup>st</sup> Half: Continuation Betting, Fundamental Theorem of Poker, Flop Analysis
- 2<sup>nd</sup> Half: Implied Odds, Set Mining, Bluffing (with draws), Bluffing Epiphany 1, Bluffing Epiphany 2

