

PROBLEM SET 07

YOUR NAME

- (1) In Marc's casino, I have a game called Mediocre Poker. In this game, I shuffle a deck and (fairly) deal you 5 cards. I take the highest value of your hand and I the pay out *one* of the following: **Pair or less** (Nothing), **2 Pair** \$2, **3 of a kind** \$5, **Straight** \$25, **Flush** \$50, **Full House** \$100, **4 of a kind** \$500, **Straight flush** \$10,000, **Royal Flush** \$100,000. (Remember from the class handout that there are 123,552 ways to get a 2 Pair, 54,912 possible 3 of a kinds, 9,180 Straights, 5,112 Flushes, 3,744 Full Houses, 624 possible 4 of a kinds, 32 Straight flushes, and 4 Royal Flushes.)
- (a) What is the expected value of playing one game of Mediocre Poker?
 - (b) What is the variance of playing one game of Mediocre Poker?
- (2) In Marc's Casino, I've decided to automate Mediocre Poker using a coin operated machine. My machine accepts nickels, dimes, and quarters.
- (a) Set up a recurrence relation for the number of different ways one can pay $5n$ cents to the machine (where the order in which the coins are inserted matters).
 - (b) What characteristic equation would we have to solve to obtain a closed form solution for the above recurrence relation?
 - (c) If it costs \$1 to play Mediocre Poker, how many ways are there to feed the machine?
 - (d) How many ways would there be to insert 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 cents, respectively, if my Mediocre Poker machine took only 3-cent-pieces and pennies?
- (3) (a) List all 16 of the relations on $\{0, 1\}$:
- (b) BONUS: *Name* all of the 16 relations on $\{True, False\}$ (e.g., "and", "only if", "nand"):