

Art 380: Game Theory

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Fourth Lecture

Lecture plan:

1. Chapter 5: Interactivity
2. CCA and its children
3. Space War
- 4.

Chapter 5: Systems

- A game is a system that creates meaningful play
- Systems have
 - objects
 - with attributes,
 - that have relationships
 - in an environment
- Systems analysis is from Communications theory

Formal, Experiential, Cultural

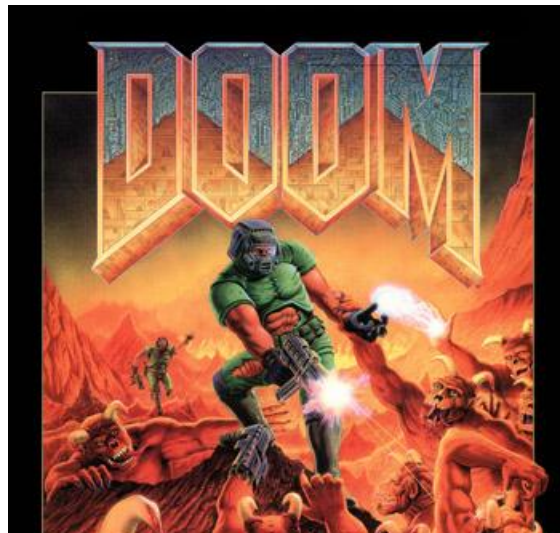
- Mimics the "Rules, Play, Culture" analysis triple from chapter 9
- Formal analysis of a game: rules only
- Experiential analysis: players using the rules
- Cultural analysis: considers the players embedded in their culture

Application of systems analysis

- Identify the components, within the defined scope
- Formal of chess: the objects are the markers
- Experiential of chess: the players are the objects
- Cultural of chess: game and players=obj

Open and Closed

- Does your system have to deal with exterior factors?
- Doom in our culture:
 - At time of release, it was a technical marvel
 - After Columbine happened, it was reviled.
 - The cultural context changed, not the game



We care why?

- Another framework for analysis
 - (=>critique)
- A set of analysis tools for looking at
 - how your game pieces interact
 - how your players interact
 - how the game lives in the world
- A work must be loved, or it is not preserved

Computer-Assisted Games: Colossal Cave Adventure!

- Colossal Cave Adventure!
- Written by Will Crowther in '75 and '76 on a PDP-10
- Expanded by Don Woods-- added a Dwarf
- Original sourcecode: <http://jerz.setonhill.edu/if/crowther/>
- ~700 lines of FORTRAN
- *"You are in a maze of twisty little passages, all alike"*

Key phrases

- *"You are in a maze of twisty little passages, all alike"*
- *"Rubbing the electric lamp is not particularly rewarding. Anyway, nothing exciting happens."*
- (When trying to kill the bear) *"With what? Your bare hands? Against his bear hands?"*

We care why?

- The first Text Adventure, a new game genre
- The first attempt, of so, so many, to automate Dungeons and Dragons, itself a new genre (1974).
- Gave rise to
 - Infocom Games
 - MUDs

Infocom's ZORK

- An early, commercially successful computer game
- A text adventure
- Written in/on the "Z-Machine", a virtual machine
- Interpreters for various platforms:
 - <http://www.ifarchive.org/indexes/if-archiveXinfocomXinterpreters.html>

ZORK as a game

- text on a black screen
- you type in text commands, it responds with a text description of the outcome
- this implies that the program can understand English
 - it can't
 - it can generally understand two-word sentences : “kill the grue with the sword”
- the game is navigation and puzzles

ZORK's contribution

- “It is pitch black. You are likely to be eaten by a grue.”
 - better get the lantern, or die a gruesome death
 - get it?
- “You are in a maze of ...”

MUDs

- After the internet, and just before, there were (and are) Multi-User Dungeons
 - dialup!
- LambdaMOO is one widely-used program
- Development continues

MUD culture

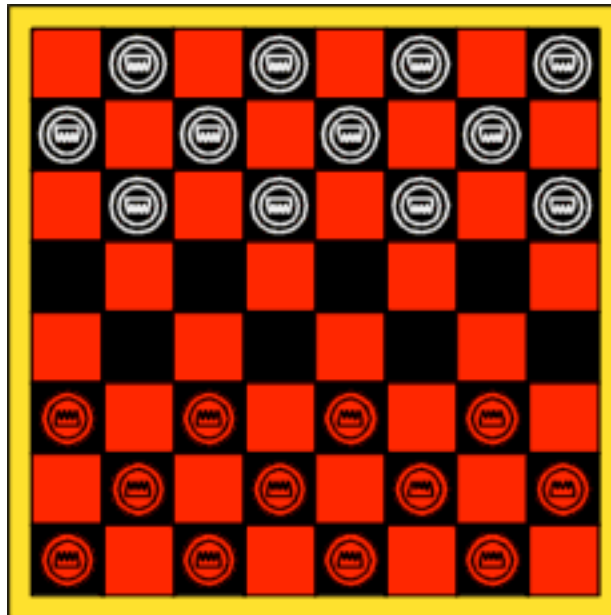
- WOW and Everquest have social structures taken directly from MUDs
 - newbies, wizards, trolls, sexual assaults, ...
 - wizards as monsters, but also wizards as privileged players who could create content

War-Games

- Board games that simulate combat using markers that capture
- Yet to be done: board games of alignment, and hunt games
- Chess, Checkers, Tafl, so many others

theme and variations: Checkers

- checkers is a board game
- equipment: 12 markers each of two colors, a board with the pattern shown—
illustration shows initial arrangement



definitions

- a marker gets “kinged” when it reaches the opposite side of the board
- “forward” is towards the side of the board opposite the player
- a “capture” is removing an opponent’s marker

rules

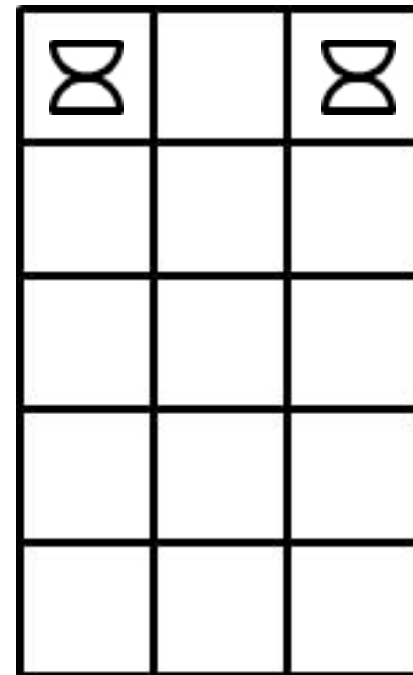
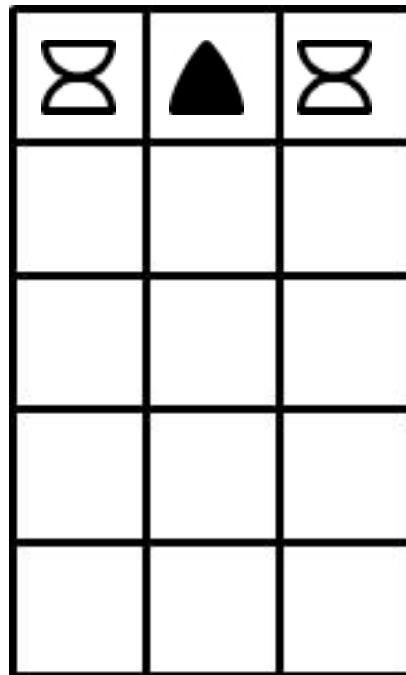
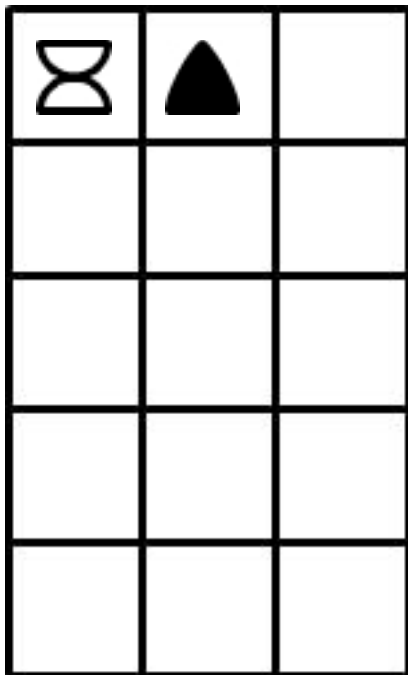
- players take turn moving markers
- markers can only move forward, one space, only on black squares
- unless you can capture, which you do by jumping over a single opponent's marker, in a straight line, to an empty space
- if, after capturing, another capture is possible with
- the same piece, player can move again
- kinged pieces can move backwards, too

rules

- players must move each turn
- the winner captures all of her opponent's markers

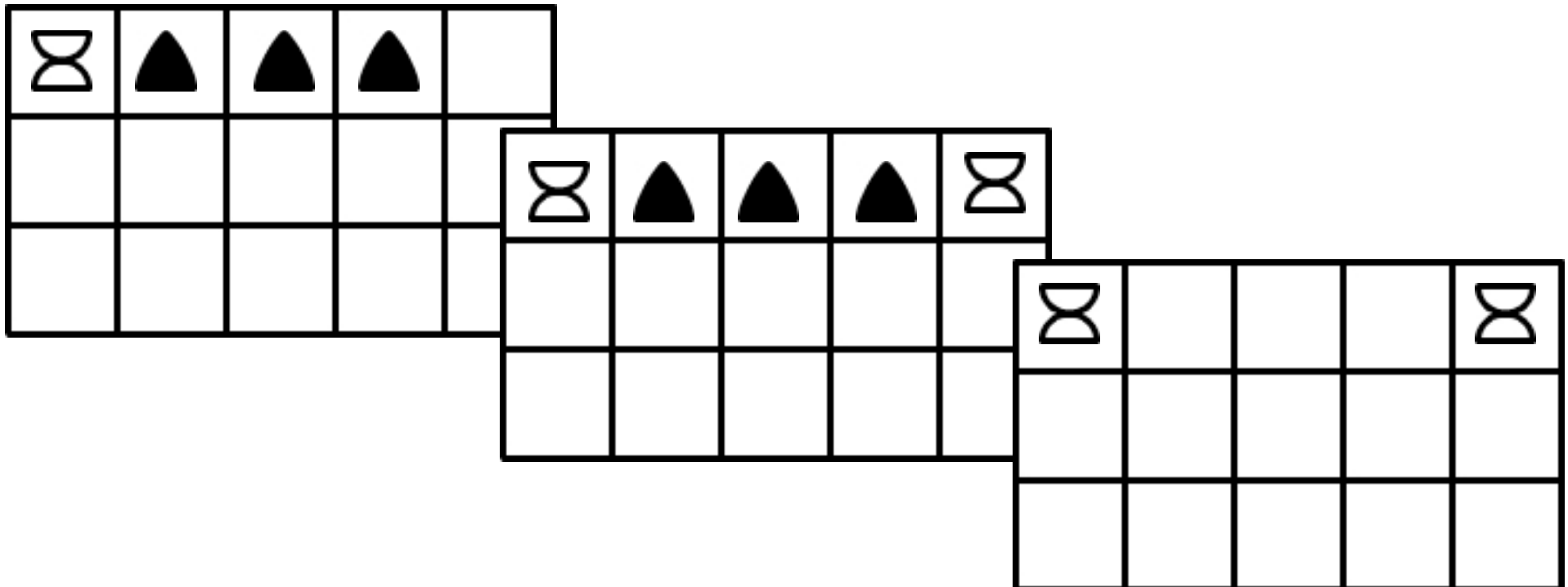
Ways to capture

1. Replacement: moving a marker to an occupied square captures the occupant
2. Interception: capture by adding a bracket



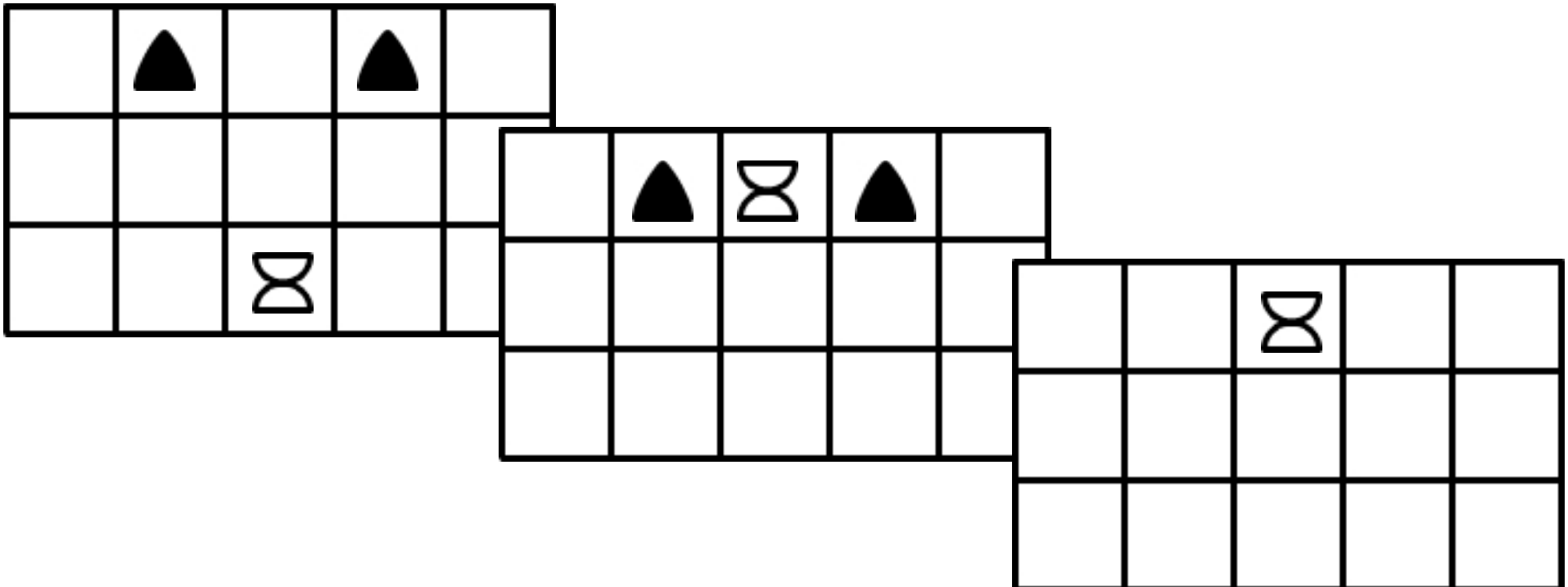
Capture Method 3: Line Interception

- capturing by bracketing each end of a sequence
 - can also convert white to black and vice-versa



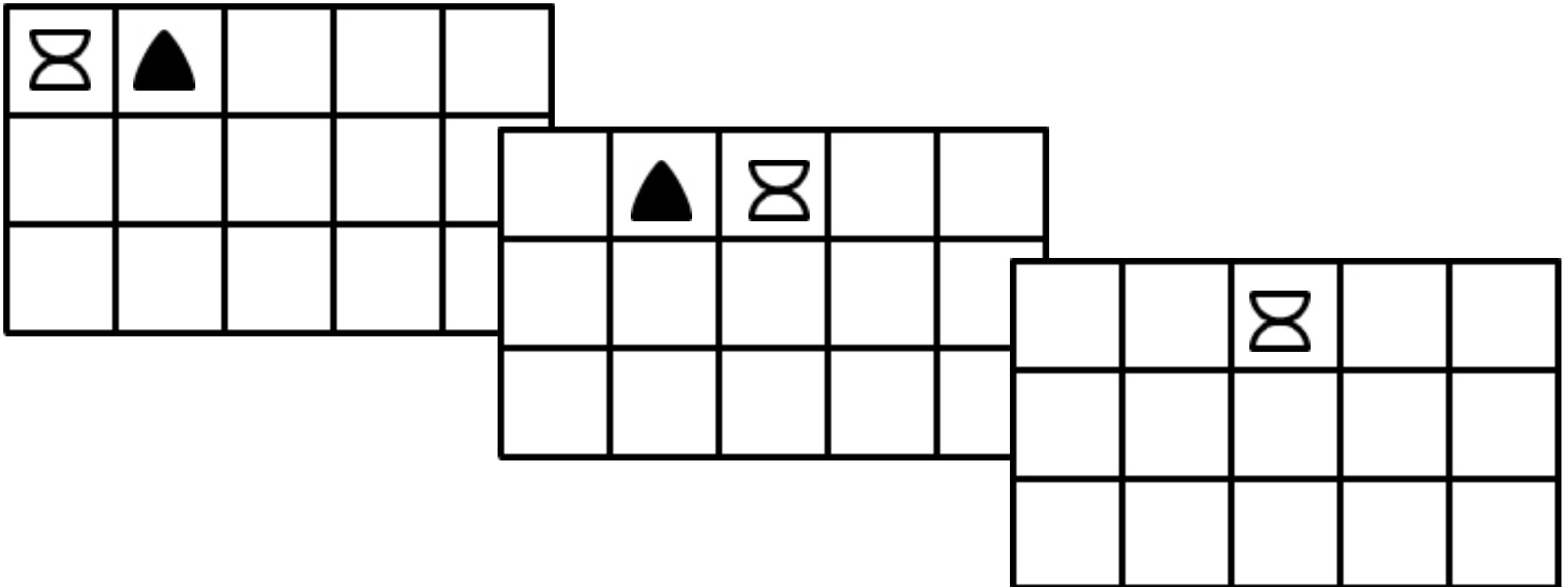
Capture Method 4: Intervention

- capturing two pieces by moving between them

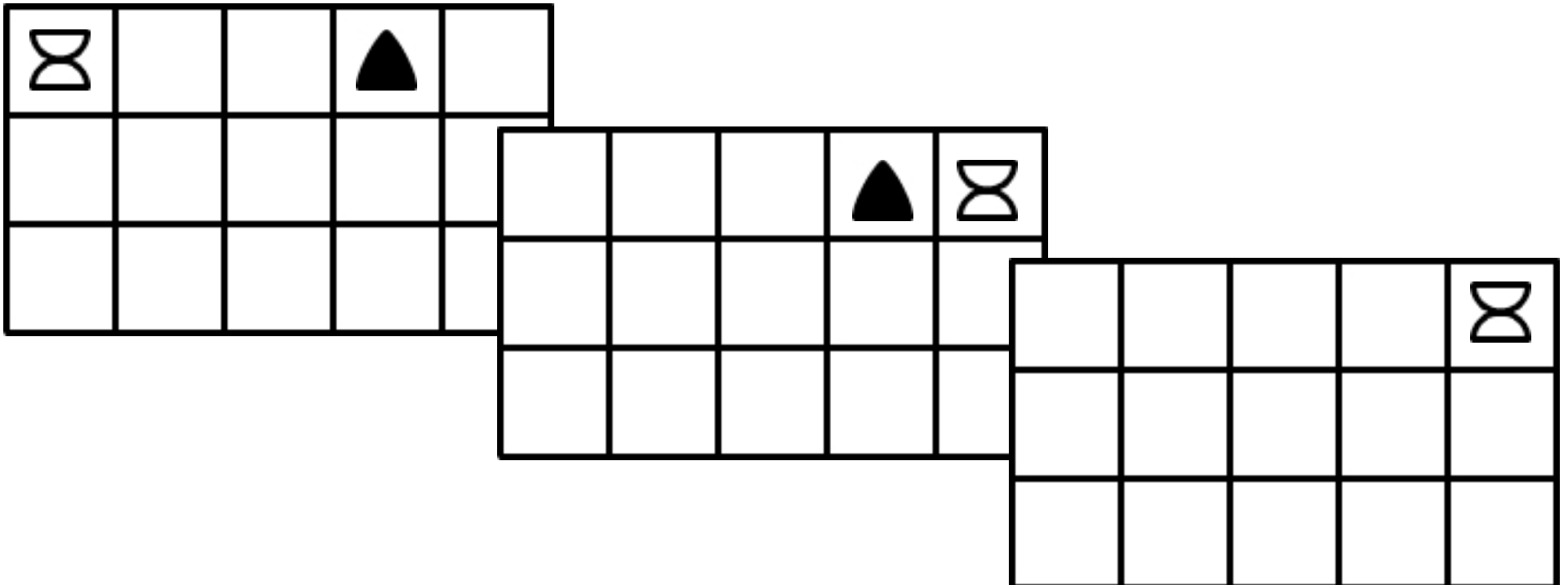


Capture Method 5: Short Leap

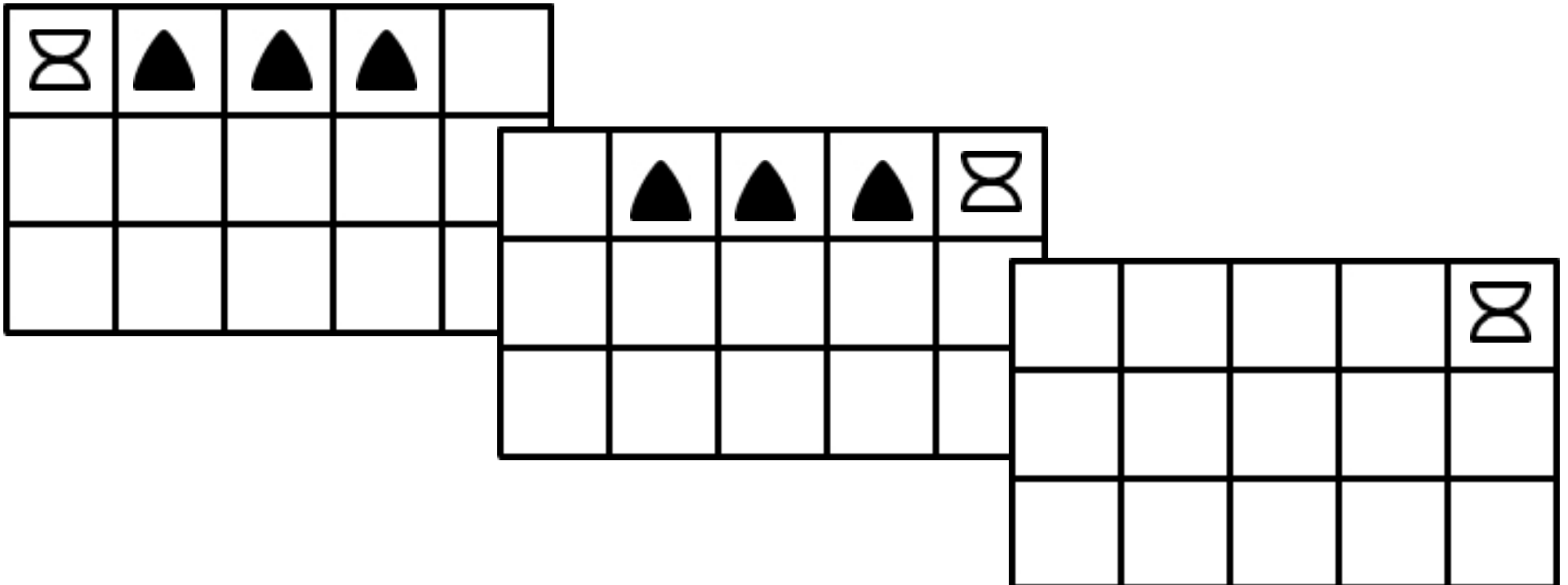
- capturing by jumping
 - checkers



Capture Method 6: Long Leap

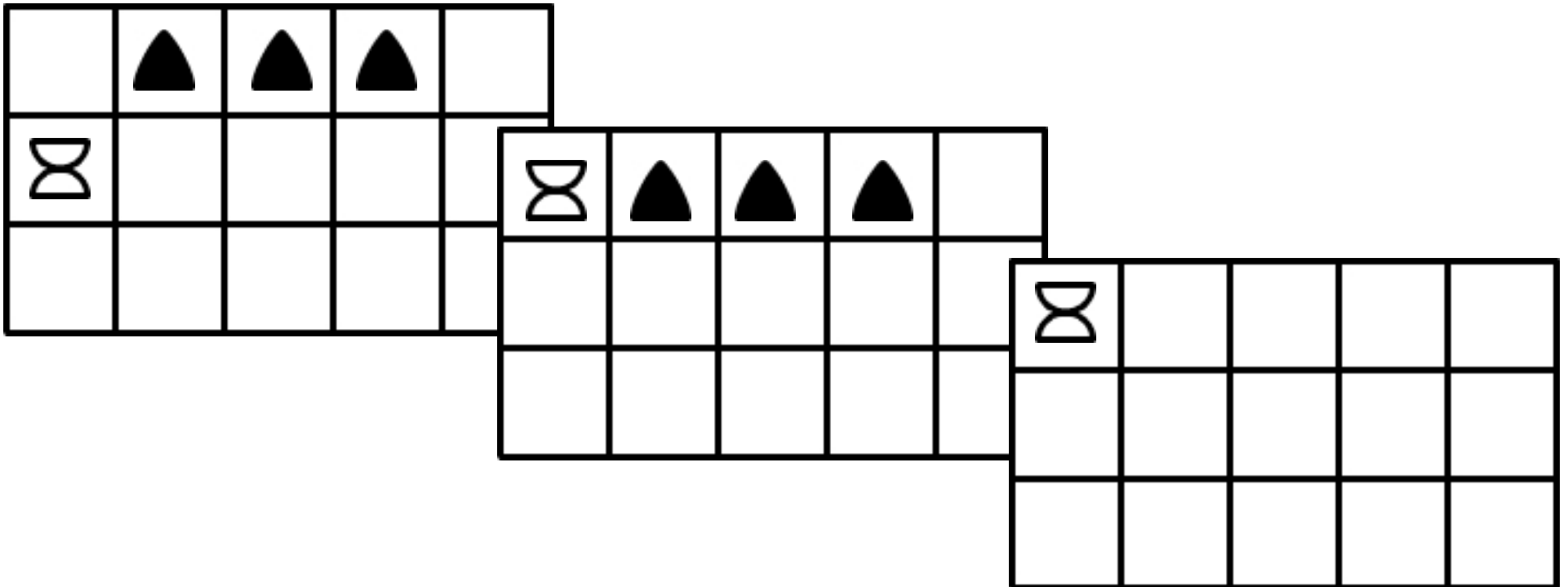


Capture Method 7: Line Leap



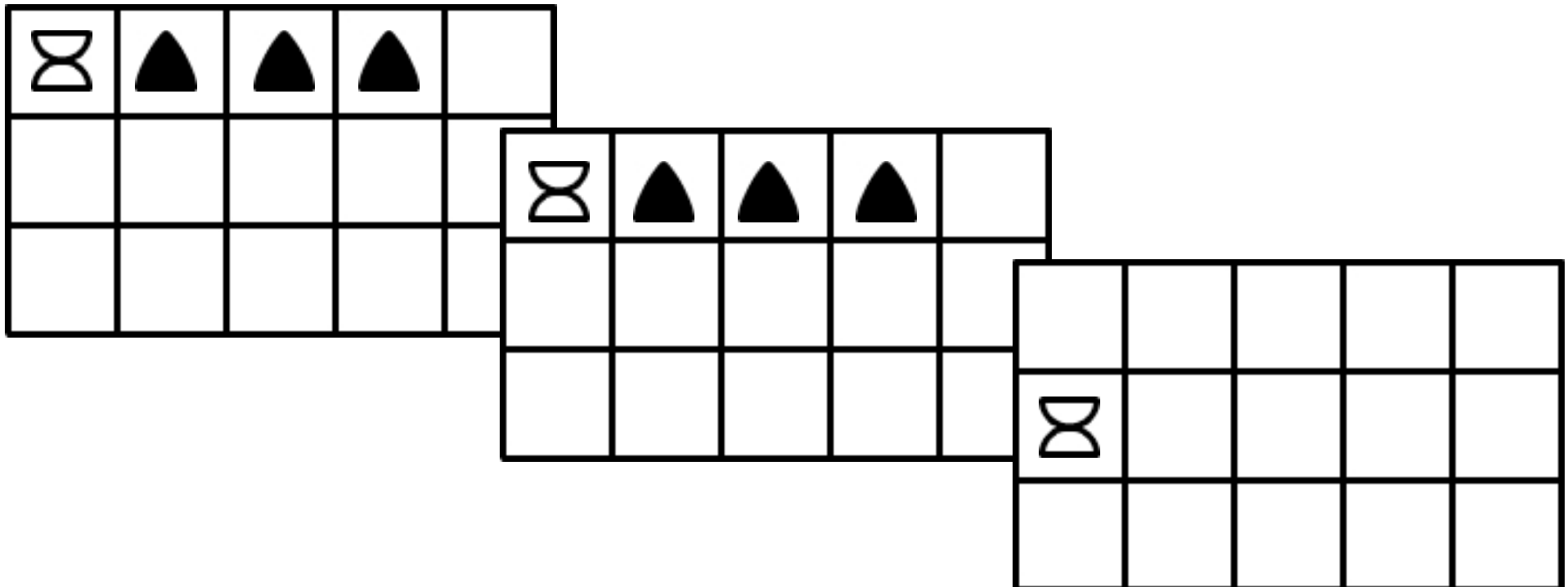
Capture Method 8: Approach

- capturing by moving onto the end of a line
 - often allowed only when the number of markers in the line is odd (or even)



Capture Method 9: Withdrawal

- capturing by bracketing each end of a sequence
 - can also convert white to black and vice-versa



Capture Method 10: Huff

- if you are required to capture, and don't, then your opponent can just take a piece
- how many billions more can you invent--or remember?
 - 11: Cannon move in Chinese chess

Options for Capture Results

- Removal -- captured pieces are out of the game
- Conversion -- captured pieces become friends (Othello)
- Locking -- captured pieces cannot be moved any more
 - stunning? pieces cannot be moved for some turns
 - what's the difference between army and landscape?
- Damage -- become slightly less effective
 - all TBS's, RTS's, D&D, Pokemon!
 - Many forms of damage: poisoning, reduced movement
- Is capture optional?
- Is capture different for different pieces?
 - hop over some to capture others

More Capture Options

- If you capture, do you get to go again?
- Can you capture only on some moves?
- Can the ability to capture depend on ??
- Are you allowed to move into a capture configuration?

We care why?

- Pick a geometry, pick 3 or 4 rules about movement and capture, and you've got a war game
- If the war game you've got stinks, ...
- This is the canon. Learn it, use it.

Options for moving a marker (in order to capture)

- On diagonals
- Across edges
- On edges
- A certain number of spaces
- Over other pieces
- Carried by other pieces

Chess

History of Chess

- Many false claims about Greeks, Russians, Charlemagne playing chess in the stone age-- no.
- Antecedent game, Chaturanga, comes from India
 - Chaturanga is lost
 - it is mentioned 4 times in all pre-1000AD Indian literature
 - "Indian Chess", with 4 players and dice

History of Chess

- The first recorded games are from the Court in Baghdad of the Abassid Caliphs-- ~800 AD
- These are known only from 12th-century manuscripts
- There are statements about earlier games, among Arab kings, but they seem to be fictional

History of Chess

- We don't know where it comes from, but it's either India or Persia, probably India.
- Probably arrived in Persia ~600AD
- By 750AD, it had spread throughout the Muslim world
- Around 1000AD, it goes to Europe
- Piece names come from Arabic

Continuing history

- Invention of new attacks, new strategies, is ongoing.
- Part of mastery is knowledge of classic games
- Chess masters of today play better than those of the past.

Play some chess

- If you already know the rules, buddy up with someone who does not
- **be nice.**

Scoring in Chess

Piece	Points
King	-
Queen	9
Rook	5
Knight	3
Bishop	3
Pawn	1

Basic Strategy

- Maximize your score throughout
- The game has 3 phases
 - Opening game-- getting untangled from the pawns
 - Middle game-- exchange of pieces, fight for control of the middle 4 squares
 - End game-- few pieces left, try not to stalemate, try to promote a pawn

For next time

- Chapters 6
- Play some chess.