

Handout 4: Reading 1: Main Problem and Main Elements of Simulating a Game²

Name: _____ Date: _____

Both racquetball and volleyball are played by two players or teams. To simplify discussion, we consider a player as a team of one. Scoring proceeds as follows:

The score starts at 0-0.

Team A starts serving.

When Team A wins a volley, A scores a point and is allowed to serve again.

When Team A loses a volley, A loses the serve, but no points are scored.

Team B starts serving.

When Team B wins a volley, B scores a point and is allowed to serve again.

When Team B loses a volley, B loses the serve, but no points are scored.

A team only scores points while it serves and wins volleys. When a team loses a volley, it loses the serve, but no points are scored. In racquetball, the first team to reach 15 points wins; in volleyball, a team wins when it reaches 15 points, but it must win by at least two points. For example, if the score is 15-14, then the team with 15 points wins immediately in racquetball, but play must continue in volleyball until one team leads by two points.

Simulating a Game

While details of a game may be handled in many ways, it is natural to use the flow of a game to structure the code. Ignoring initialization, there are two basic approaches:

Game Approach 1: Proceed serve by serve until someone wins

Serve

 if server wins volley

 score a point

 if server wins game

 report winner

 else

 same server serves again

else

 other team serves

Game Approach 2: Game proceeds with the sequence A serves, then B serves

 Continue until someone wins

 A. A serves until A wins game or loses serve

 B. If A has not won

 B serves until B wins game or loses serve