

Introduction

ASE card tennis is designed to be a game that provides a reasonably comprehensive simulation of lawn tennis without too much playing complexity. All player shots are simply made by selecting Rally Cards from a hand which is then replenished back to its starting size, and movements around the court are made by player choice. Probabilities for player errors and degree of difficulty of shots are incorporated. Those probabilities, and those for the type of shots that may be played, have been gathered from a detailed analysis of professional tennis matches.

This document provides background to some of the design decisions, and areas where feedback would be especially welcomed. The intention is to give information that helps game testers to judge the extent to which the design goals behind these decisions have been met.

Basic Positioning

I have several tennis games, but find most very unsatisfactory. I wanted to make sure that the game was a reasonable simulation – that the players could picture what was happening on a real court in their minds, and that what was happening made sense. To do that, I wanted to make sure that the game would include real world frequencies of types of shot played, and real world probabilities of those shots succeeding or failing. And I wanted the rallies to be sensible – sensible shots played at sensible times from the right part of the court.

Tennis is a game of movement and shot making skill. Both are important to being a successful player. So I quickly decided that players of the game would have to control both aspects for their tennis player. This meant that knowing where each tennis player was on the court, and where they are moving to, was vital. Many other tennis games ignore this completely. But as soon as I decided to incorporate movement and positioning, it meant that the shots available to a player had to depend on that, too. This meant that the number of 'shot combinations' available would be quite large.

The other key design driver was that I wanted the game to be mechanically as simple as possible. 'Pure' stats-based games tend to have a pause after every player decision whilst dice are rolled and charts looked up. I wanted none of that. Indeed, I wanted to ignore dice at all, if I could avoid them. Sure, I wanted random outcomes of actions based on real world probabilities, but looked for another way to do that, which avoided the interruption in the flow of the game which dice throwing necessitates. So I came up with a mechanism where the game was basically one of playing cards from a hand, but which allowed probabilities to be incorporated. Unfortunately, after several iterations, I found that the mechanism was just not flexible enough to provide the statistical accuracy that was necessary in my mind. So some dice snuck in.

The Cards

It was clear from early on that I would need a number of decks of cards to give the player options. Clearly one deck for shots was needed. That was enough to manage rallies, but serving and returning was (obviously) needed too. I thought through a number of options here – having a deck of cards which are both serve and return; having a serve deck and a return deck; or having just a serve deck and using 'normal' shots for the returns. I eventually settled on the latter.

The first option suffered from a couple of major problems – 1) coupling the serves and returns onto one card would probably require an explosion in card numbers needed to get all the options and 2) it would not be easy to allow one of my design goals (admittedly as an 'advanced option')

of allowing players to be handicapped or helped in areas of their game. If you wanted to allow a player playing as Karlovic to be very good at serving, without also making him very good at returning, doing that with coupled cards would be difficult.

The second option suffered from equipment bloat – another deck to manage (and pay for in production).

The major problem with the third option was dealing with probabilities. Unfortunately, many serves are harder to return than normal shots, so I needed a mechanism to allow a shot to have different probabilities based on its usage. I eventually solved this with the idea of probability adjustments, which was a mechanic I needed elsewhere anyway.

In the first drafts of the mechanics of the game, I had a movement deck of cards, as well as the rally & serve cards. Players had to manage these movement cards as well as their shot cards, and play the movement cards at the time(s) when the player moves. The movement cards had probability symbols to compare with those on the shot/serve card. I eventually abandoned this idea for a number of reasons, including:

1) There were difficulties managing the sequence of events. Since the symbols were being used to determine whether shots failed or not, there was a need to come up with a mechanism to select the cards blind. Otherwise, if the movement card was played first, the shot maker would pick a shot that did not have that symbol on it. If the shot card was played first, the opponent would play a movement card that did cause the fault.

2) Whilst I do not have too much problem with the idea that the shots available to a player might be somewhat limited based on the cards in the player's hand, the idea of that sort of limit on movement seemed daft. Having a player unable to move forward to play a short ball because he didn't have a forward movement card in his hand seemed to be too unreasonable.

Option frequencies

The obvious way to manage the frequency of player choices (shots, movements) is to provide numbers of cards in proportions that match real world frequencies. In order to achieve that, I had to sit down and carefully capture those frequencies by watching matches and capturing information about every shot. This takes ages, and is not finished – so early prototypes will have educated guesses for much of that. Thus far, I have fully documented one set on each of grass, clay and indoor hard. I am working on an outdoor hard set, too. That gives a base data set of a thousand shots, or so. I clearly need more to get the 'stats' right, especially on the less frequent events where a probability based on a handful of shots is questionable at best. The probabilities on the current decks of cards are a mixture of statistically valid from lots of data, and educated guesses. Hopefully, as I capture more stats, the number of educated guesses will reduce.

There was also, obviously, some pruning required for very unusual options. In a number of cases those options are just ignored – so shots I have seen played in the real world do not appear as options. I also decided to handle special shots (lobs, dropshots, smashes, volleys) in a slightly different way, to avoid them causing an explosion of shot cards.

Probabilities

As stated above, I wanted to include mechanisms for probabilities of outcomes without dice rolling and chart lookup. If the probability mechanism was to be unobtrusive to the flow of the game, then it had to be on the shot cards in some way. However, it could not be on just one card,

since the player would not choose to play a card that had a bad result. I wanted a situation where a player playing a passing shot, say, 'knows' that there is some probability of hitting the net, some probability of hitting it out, some probability of making the pass, and some probability of the other player getting to it; but without knowing which of those will happen for that shot.

When I originally had a two part game-move approach – a player having to play both a movement card and a shot card - that gave me a mechanism that I could use. I could have some sort of probability set-up and resolution that required information from both the shot card of one player, and the movement card of the next player. To keep the game flowing, I wanted that mechanism to be visual and easy to resolve. So I came up with the concept of probability symbols. When I abandoned movement cards I kept the idea of the cards with probability symbols on them.

However, I eventually had to abandon the probability symbols as well – they were just not flexible enough. So I ended up with dice after all. Hopefully they are not too obtrusive, and the 'looking up' that is needed is only against the current card anyway.

Feedback Requests.

Specific Feedback requested

1) Terminology

Most, if not all, of the terms used in the game are up for grabs, if necessary. So, is "shallow" OK or would you prefer "short"? Are the shot descriptions OK? Are you happy with "dink" as the name of a shot? Etc., etc.

2) Tennis mechanics 'rules'

I have a number of tennis 'rules' built in. For example:

- a) Deep shots are not playable from good length? Is this OK? Or should they be playable with a negative probability adjustment?
- b) Are you comfortable with the restrictions, etc., based on depth of shot? These are not meant to be completely realistic – this is a game after all – but realistic enough to give sensible results most of the time, whilst giving game players decisions to make and options to weigh.
- c) There are fairly simplistic restrictions on movement – you cannot move forward against a serve unless it is slow, etc. Are these OK?
- d) What do you think of the size of the penalties (in probability adjustments) for moving before you hit your shot?
- e) Once upon a time, I had a rule to stop you from 'running around the forehand'. But on detailed analysis, I found that there are plenty of shots played with a forehand from deep on the backhand side! So do we need some restriction here, say based on how far you have moved? The problem, as ever, is trying to balance simplicity with quality of the simulation – they tend to be mutually exclusive.
- f) I struggled mightily to come up with a mechanism for the non-ground strokes – lobs, dropsots, dinks around the net, smashes and volleys. Some of the stats are quite surprising here. The card deck actually has more of these than the stats would say are necessary, but there still doesn't seem to be 'enough'! I want these shots to be played, but I can see players dumping volley cards to keep a more balanced set of groundstrokes in their hand. One idea I have toyed with, is maintaining a separate 'hand' of a few of these special shots, so that they are always available. It

seems to be unsatisfactory to have a mechanism where, for example, a player can run down a dropshot, but then not be able to play a shot because they do not have a 'dink' in their hand.

g) The numbers of cards for each player are up for grabs. In my experiments thus far, I have been using numbers like 6 serve cards and 8 rally cards. This doesn't seem to be too bad, but may not be the 'best'. So any feedback / experimentation that you could do would be appreciated. I want this to be a reasonable simulation, but it needs to be a game, too. If players have too many cards, the 'game' aspect of managing a hand, and deciding what shot to play to leave you options as wide open as possible for the next shot would be lost. If they have too few, the simulation breaks down because rallies end too quickly because a player doesn't have a valid card to play.

h) Please feedback comments about the probabilities and balance of cards. These will be subjective, but will help to get the balance of the final deck of cards 'correct'. In particular, I suspect (but need to record details of cards played in games to check), that I can provide fewer cards of the most common shots, and not distort the frequencies that those shots are played, and thus, perhaps, open up the opportunity for some other shots to be added. For example, I have recorded several forehand slice shots in the sets I have documented, but too few to justify a card.

i) Please comment on the movement aspects of the game. Movement seems to be important, so I included it, but if you watch matches carefully, as I have been doing, you will see that player, for obvious reasons, tend to migrate back to the centre of the court around the baseline. I want/need to make sure that the balance of the game encourages players to move towards the net when they would do so in real life.