

## HOMework TO SEMINAR 5

Think about these probability problems and try to answer them. You are encouraged to write programs testing your intuitions.

- (1) In some countries, having a son is considered important. Therefore, families go on getting children until they have a boy and then they stop. How does that influence the proportions of boys and girls?

- (2) Hardware failures are independent random events. For some computerized equipment that you consider buying, the operation statistics indicate that failures necessitating reboot occur on the average once a week. "That's a little too frequently for my taste", you say, but the salesperson comes up with the following argument.

"Whenever you start using this equipment, you may count on one error-free week. But of course, the last error was one week ago on the average, so the interval between errors is two weeks on the average."

Do you buy that? Note your first reaction, then test it in a small example. Did you have reason to reconsider afterwards?

- (3) A net poker site has introduced a new game: Red Vibes. The objective is to guess when the next card is red. The stake is 100 SEK and the return is 200 SEK if your guess is correct. This is how it goes:

A shuffled face-down deck of cards is on the screen. Every second, the top card is turned face-up and then discarded. At any time during the fifty-three seconds that one game takes you may click on the face-down top card and if it turns out to be red, you win. If you don't click at all, your choice is taken to be the last card. The deck contains 26 reds, 26 blacks and one joker.

Obviously, clicking the first card will make you lose money on the average, but possibly there exists a better strategy, something like "await a situation where more blacks than reds have been turned up, then click!" If you can program a bot who plays a winning strategy, the millions will start rolling in effortlessly. Worth trying? Why don't you program a strategy and test!