

How long does it take to Beggar My Neighbour? Mike Mudge invites attempts at a computer-generated solution.*

*Oxford English Dictionary: *beggar* ..v.t. Reduce to poverty.

The area of investigation this month arises from the card game sometimes known as 'Beggar My Neighbour' and has been suggested by Peter Walwyn of Porthmadog, Gwynedd.

Rules of Beggar My Neighbour

The game is played with one standard 52-card pack which, after shuffling, is dealt *face downwards* into two equal hands.

The toss of a coin may be used to determine which player (hand) starts the first game; after that, the winner of the previous game deals and starts the associated game.

The players hold their hands *face downwards* and take it in turns to remove the top card from their hand and place it *face upwards* on top of the pile. This process continues until either: (1) the player whose turn it is to play has no more cards, in which event the opponent is declared the winner; or (2) a face card (Ace value 4, King value 3, Queen value 2 or Jack value 1) is turned up and placed upon the pile, whereupon the other player has to 'pay' a number of cards from the top of the hand up to the above value.

If, however, in the course of paying, another face card is paid, then the opponent begins to pay in the same way until either: (a) the full value has been paid in consecutive non-face cards, in which case the non-payer picks up the entire pile, turns it over *face downwards*, places it under the hand, and then begins the next play; or (b) the paying player runs out of cards, in which case the opponent is declared the winner.

Project A Design and implement a computer program to play Beggar My Neighbour. Peter Walwyn

uses GW-Basic compiled using Microsoft's Bascon v1.0 (1982) and run on an SBC HD20 XT with RND to simulate the dealing of the hands. The average run time achieved is 5.25 games per second.

Test Data A (denotes a non-face card)

Player 1
...JAQ.....Q...JQ.....J....
Top of hands.

Player 2
....QJ....KA....KA....K.K.A.
Player 1 starts and wins after 112 plays.

Test Data B
Player 1
K.Q..A.QA..K.....J.K.
Top of hands.

Player 2 Q.J.J.....AQ....K
Player 1 starts and wins after 3092 plays.

Project B Investigate this begging algorithm in depth. Construct an empirical statistical distribution of length of game (in plays) against frequency of occurrence.

How many possible distinct games are there? (Note that only the locations of the face cards are important.)

***** Are there hands which loop?*****

(Peter asks if there exists a neat matrix formulation of the game to allow algebraic iteration of N-plays?)

Thought for the month

Personal computing is essentially a solitary occupation. Christmas can be a very lonely time. Computer software is readily available for playing chess, backgammon, bridge, and so on, not to mention the myriad of purpose designed computer games. What knowledge, experience or other thoughts do readers have regarding computer patience?

The software would of course replace the pack of cards, and should ensure that the rules are not broken. Supply, where possible, a statistical prediction of the

possible outcome, and cover many versions of patience. *The Complete Patience Book* by Basil Dalton (entirely reset in 1964 by John Baker Publishers) describes 52 versions of patience selected from some 350 and seems a natural starting point for such a project.

Attempts at some or all of the above projects may be sent to Mike Mudge, 1 Dolboeth, Cwm Mabws, Llanrhystud, Dyfed SY23 5BB, tel 0974-272548 to arrive by 1 March 1991. Any communications received will be judged, using suitable subjective criteria, and a prize will be awarded by PCW to

the 'best' contribution arriving by the closing date.

It would be appreciated if such submissions contained a brief description of the hardware used, details of programs, run times and a summary of the results obtained; together with suggestions for further work in this area, all in a form suitable for publication in PCW.

Please note that submissions can only be returned if a suitable stamped addressed envelope is provided.

Mike Mudge welcomes correspondence on any subject within the areas of number theory and computational mathematics. Particularly welcome are suggestions for further Numbers Count articles.

LEISURE LINES

Brainteasers courtesy of JJ Clessa.

Happy New Year to all! It's 1991, the only palindromic year this century (although 1961 reads the same upside down).

Here's a quickie to start the year off. No answers, no prizes. A domino set with the highest domino of double-six contains 28 pieces. How many dominoes would there be in a set going up to double-twelve?

Prize Puzzle

And now, as they say, for something completely different. A genuine simulation model required here.

For the uninitiated, a shove-ha'penny board is rather like a zebra crossing, with horizontal lines equally spaced along its length. If you were to throw a stick of length equal to the distance between two lines, randomly onto the board, it would obviously fall either across a line or clear of a line. (Assume that the board is of infinite width.)

For this month's puzzle, I want you to throw the stick (by computer, preferably, but

manually if you wish) over and over again, and divide the number of occasions on which the stick crosses a line by the total number of throws. Multiply this ratio by 4 and send me the answer — you might be surprised at what you get, assuming you do sufficient throws.

A little bit of thought and Pythagoras (or trigonometry) will be needed at the outset to set up the model, but not much. The rest depends on the random number generator in your computer.

Answers on postcards or backs of sealed envelopes — no letters please. Send to: January Prize Puzzle, PCW Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 31 January 1991.

Winner, October 1990

The winning entry came from that most exotic of seaside resorts, Southend on Sea, from Mr Bruce Williams who gets our congratulations and, quite soon we hope, his prize.

The correct solution was: 4,383,592. A bit easy really, although this month's puzzle is rather more difficult. So, to the also-rans, don't give up — this month you could win.