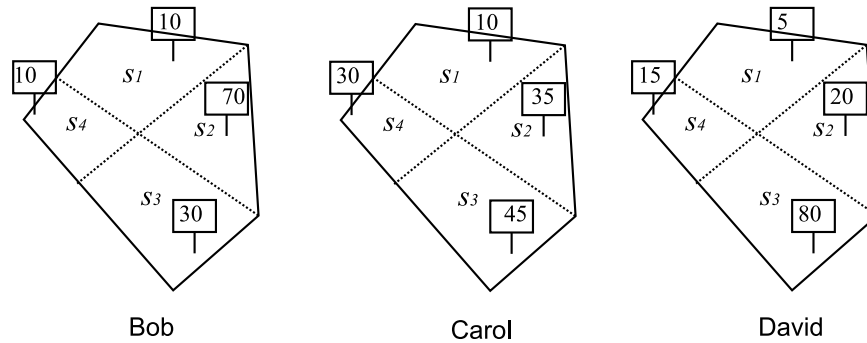


- Four people, Alice, Bob, Carol and David, wish to divide some land using the lone divider method. The land is valued at \$120,000 by all players. Alice proposes a division into four parts which she values as worth \$40,000 each. The values the other players give these parts is shown below, where the figures in the signs indicate the value to the players in thousands of dollars.



- For each player indicate which pieces of land they approve.
  - Propose a simple fair division of the land.
  - Explain why this division is not envy free. Who envies whom?
- A cake is divided among 5 players ( $P_1, P_2, P_3, P_4,$  and  $P_5$ ) using the last diminisher method, with players playing in the order given. In round 1,  $P_1$  cuts a piece and  $P_2$  and  $P_4$  are the only players to trim the piece. In round 2,  $P_3$  is the only player to trim a piece. In round 3 nobody trims a piece.
    - Who gets the piece in round 1? in round 2?, in round 3?
    - Who will be the last person to choose at the end or round 4?
    - Which players will view their share as being more than  $1/5$  of the cake?

3. Three sisters wish to divide up 4 pieces of furniture that they shared as children. Their bids on each of the following items are shown in the table below. Describe the final outcome of their fair division problem.

	Ana	Bella	Clara
Dresser	\$150	\$300	\$275
Desk	\$180	\$150	\$165
Vanity	\$170	\$200	\$260
Tapestry	\$400	\$250	\$500