Discrete Mathematics

MATH1150

School of Science

CHALLENGES

Please find enclosed the second challenge.
Challenges are not compulsory but will be rewarded.
I recommend to work in group and to give your solution during Wednesday's tutorial. Even partial solutions are welcome.

Enjoy.

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Challenge 2

Subset takeaway[1] is a two players game involving a fixed finite set *E*. Players alternately choose nonempty subsets of E with the conditions that a player may not choose the whole set *E* nor any set containing a set that was named earlier. The first player who is unable to move loses the game.

For instance, if *E* = $\{1, 2\}$, then the only legal moves are $\{1\}$ and $\{2\}$. Each is a good reply to the other and second player always wins.
Show that if |*E*|=3 or 4, the second player can also always win (he has a winning strategy).

For this challenge, I recommend you to try the game two by two a few times.

[1]From Christenson & Tilford, David Gales Subset Takeaway Game, American Mathematical Monthly, Oct. 1997