

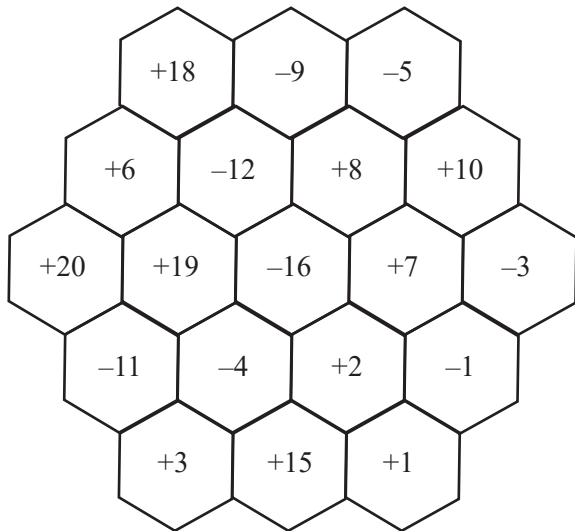
**Question 12** (11 marks)

HexaReverso is a single-player game played with hexagonal tiles. Each tile has an integer value, with one side having a positive value and the reverse side having the negative of that value. The tiles are arranged in a hexagonal shape. Large hexagonal grids can be hundreds of tiles wide.

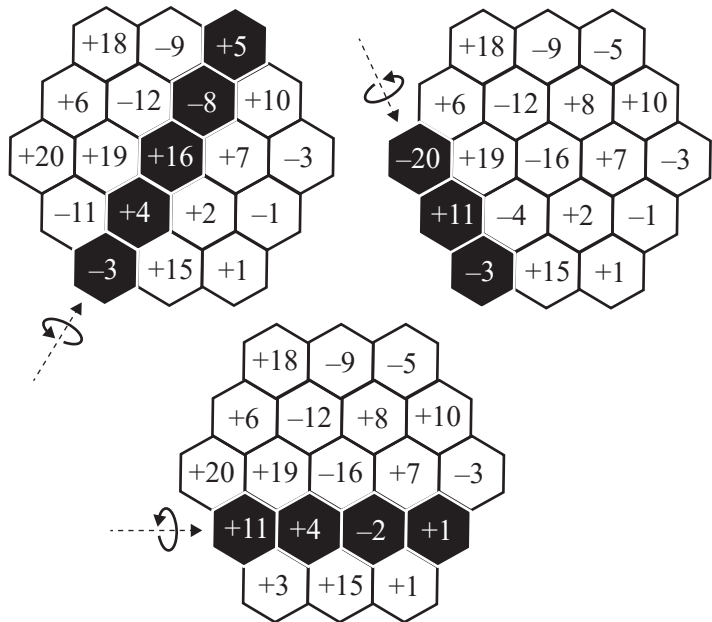
The goal of the game is to maximise the sum of the face-up values on the tiles.

A ‘row’ refers to a straight line of sequentially adjacent tiles. In the game, a player may flip any row of tiles to its reverse side. Three examples of this are shown in the diagram below. The player may flip any number of rows. It is known that this flip operation does not allow for all possible grid arrangements to be generated.

**An example of a small HexaReverso board**



**Three examples of the flip operation**



- a. It is important that tiles in a particular row can be efficiently identified.
  - i. Describe how data about the tiles in a HexaReverso game could be stored. A single ADT or a combination of ADTs may be used. 3 marks

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- ii. Explain how the flip operation would be performed within the data structure described in part a.i.

3 marks

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**NOTE: OTHER PARTS OF THIS QUESTION REMOVED.**