Task 1 For which of the following use cases would you prefer a row or column store:

- Access of all attributes of few tuples
- Aggregation of a single column
- High compression rates
- Combination of selection and aggregation (different attributes)
- Grouping over all attributes (Except: key attributes) of a single table

Provide arguments for your decision.

Task 2 Given the following column of postal codes:

| 39106 | 39106 | 39107 | 39107 | 39110 | 39106 | 39106 | 39106 | 39115 | 01067 | 99998 |

Compress the column with

(a) Run Length Encoding
(b) Delta Encoding
(c) Bit-Vector Encoding
(d) Dictionary Encoding

Task 3 Buffer management

(a) Why do database use an own buffer management?
(b) Describe the general process of the buffer management. Consider possible alternatives.

(c) Given a database with a buffer size of 5 pages. The pages a, b, c, d, e, f, g will be read in a transaction in the following sequence:

   a, b, b, b, c, e, g, f, d, b, e, b, f, e, a, g, a, b, c, a, d, f, b, b, f, f, e, b, e, g

   Compare for the given use case the page replacement strategies LRU and Clock.

Good Luck!