Run Length Encoding with Index

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1. Abstract

RLE is one of easiest compression method. Efficiency can be increased through some improvements. It is possible by the method of inserting an index into queues.

2. Introduction

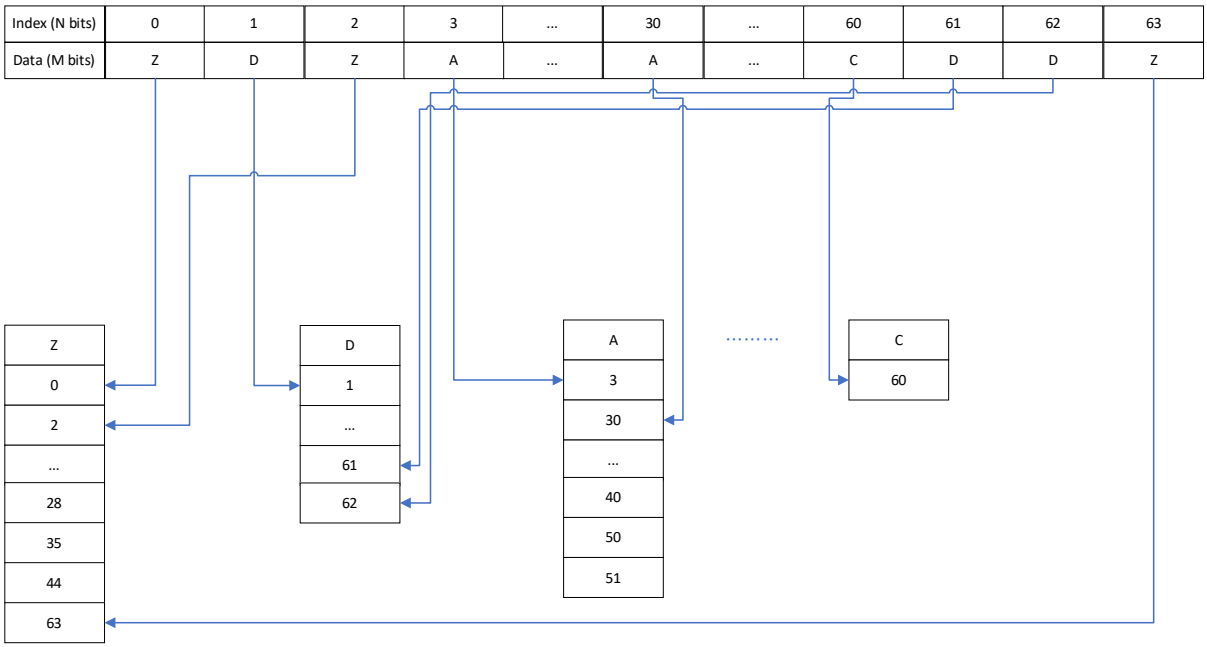
RLE was only capable of compressing continuous data.

By inserting an index into the RLE queue, it becomes possible to compress discontinuous data as well.

A data packet length is M = 2^N.

The index has a length of N bits, the data is reduced by a factor of N/M compared to data with words of M bits in length.

For example, if the position of 64-bit data is represented by a 12-bit index (4096), the data is reduced by a ratio of 12/64.



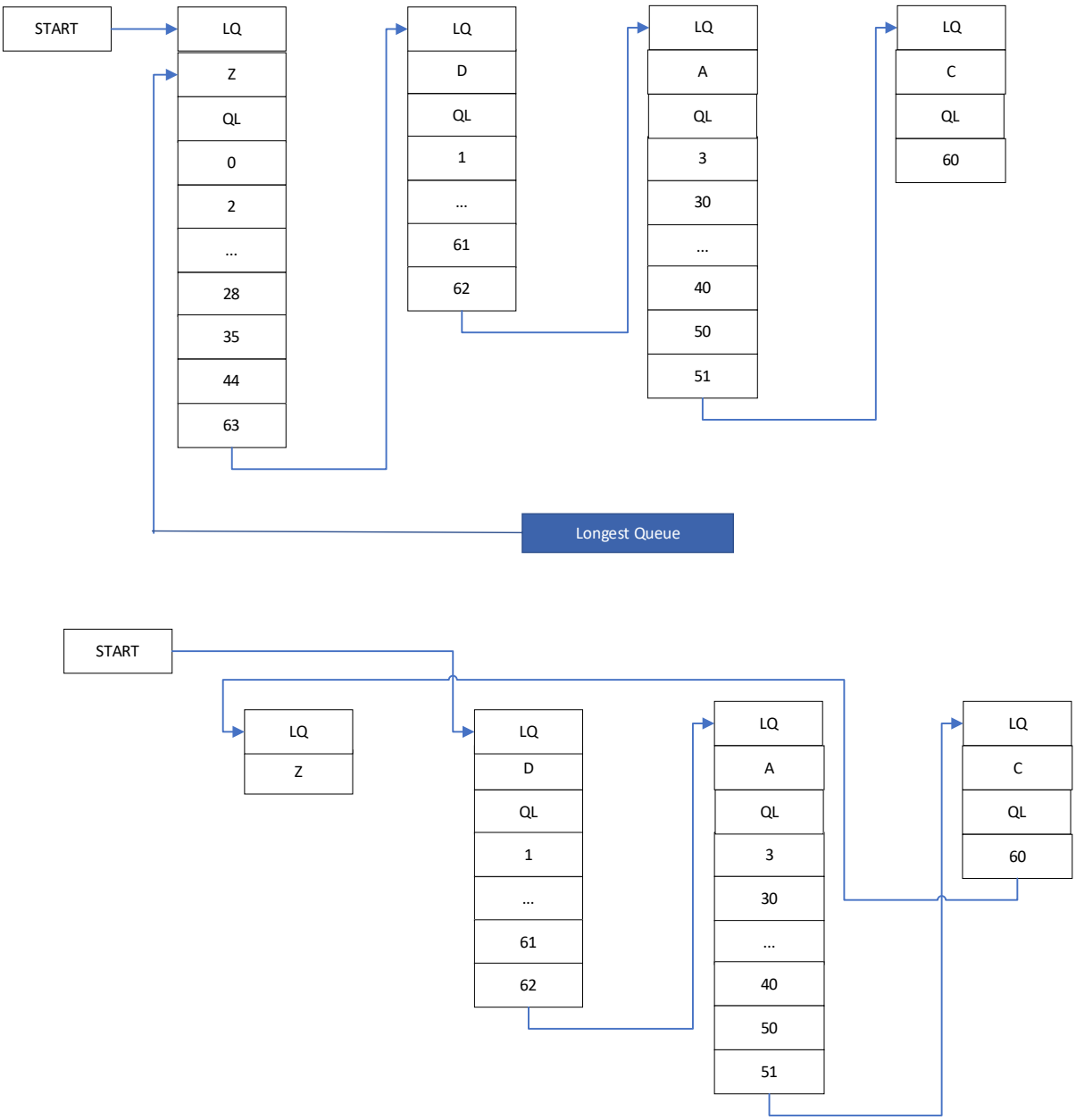
3. Method

There can be two types of queues.

Last Queue flag bit	Data (Z)	Queue Length	0	2	5	…	36	52	63

Last Queue flag bit	Data (Z)	0	End of Queue flag bit	2	End of Queue flag bit	5	End of Queue flag bit	…	36	End of Queue flag bit	52	End of Queue flag bit	63	End of Queue flag bit

The last queue does not require content. The empty spaces in the data can be filled with the data value of the last queue. Therefore, it is adjusted so that the longest queue comes last.



If the length of the data is quite short, two pieces of data can be combined to form a single cell.

For example, two 8-bit data pieces can be combined to create a 16-bit data cell. If you use a 12-bit index, it reduces to an 11-bit index, resulting in a data size of 11/16.

The index can also be represented using Variable-Length Coding (VLC).

4. Conclusions

This algorithm is very lightweight and allows for simple compression without the need for extensive computational power.