*3.* (This complete question is worth 20 marks)

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1. State the defining characteristics of a *Map* (i.e. a *dictionary* in Python), and state the standard operations offered in the Map ADT. For each operation, give a brief comment explaining what it does.

***(6 marks)***

1. Explain the concept of a *bucket array,* and outline the basic implementation of a Map using a bucket array.

***(5 marks)***

1. Explain *Open addressing* and *Linear probing* as a method to implement a Map without requiring a bucket array, yet giving expected constant time complexity for updates and retrieval.

***(9 marks)***

***Total: 80 marks***

**END OF PAPER**