- 1. In some railway stations, for count ticket reservation the customer need not have to physically stand in the queue. On arrival, from a separately kept machine, by pressing a button you get a paper token, marking the arrival-sequential number. Fill the reservation form, wait until your token number is displayed on an LED panel above a reservation counter. For our problem, we assume two counters. Each counter executive presses a button to invite the next three customers with consecutive token numbers first at the beginning, and subsequently when the third customer of the present lot is taken for service. Assume that there are enough customers always. When the counter executive presses the button, the counter number is passed to the queuing system, which allots the next three tokens to this counter. Implement the queuing system with the main queue as linked list and counter queues as arrays. Write a function to represent the actions taken by the queuing system when a counter executive presses the button. Write a function to enqueue a newly arrived customer to the station.
- 2. Given input  $\{21, 23, 13, 41, 44, 27, 31\}$  and a hash function  $h(x)=x \pmod{7}$ , show the results of:
  - (a) Separate chaining hash table
  - (b) Open addressing hash table using linear probing
  - (c) Open addressing hash table using quadratic probing