BRAC University (Department of Computer Science and Engineering)

CSE 220 (Data Structures) for Fall 24

Quiz 3

Student ID: **Section:** **Full Marks: 15**

Name: **Duration: 30 minutes**

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1. As the year 2024 is about to end, you want to keep track of every detail of each day of 2024. To do that you have chosen a Hash Table with **size 5** which uses **Forward Chaining (Linked List)** to handle collisions. Here, the **key** will be the pair **(month, day)** and **value** will be a **string** describing your day. You are going to use the following Hash Function:

Note: Here key[0] represents the month (1 to 12) and key[1] represents the day (1 to 31)

```
Function hash_function(key){
    return (key[0] * key[1]) % length_of_hashTable;
}
```

Sample Key	Sample Hashed Value	Explanation
(12, 21)	2	(12 * 21) % 5 = 252 % 5 = 2

You have to answer the following 2 questions based on the information given above:

(a) Design a function **update** that will change the value for the given **key**. To simplify, assume that the key already exists and the Node class along with the hash_function is already given. 5

(b) Can you propose an anticase for the given hash function by showing 5 different dates which will cause the highest amount of collisions? 3

2. You are given a Binary Tree. Design a function that detects whether the tree is **Perfect** or not. 7

Note: Each node in a Perfect Binary Tree has either 0 child or 2 children and each leaf has the same level.