**CS443 – Lab 5**

**Question 1:**

Use extended hashing technique to insert the employees in which their corresponding binary Empl\_IDs are shown below. Assume you can have two employees per block. Show the depth of both global and local directories. The bits should be considered from left to right as shown in the lecture..

**00001, 10000, 10100, 00111, 11011, 11101, 10010, 01111, 10101**

Insert 00001, Insert 10000, Insert 10100, Insert 00111

Diagram

Description automatically generated

Insert 11011, Insert 11101

Diagram

Description automatically generated

Continued…

Insert 10010, Insert 01111, Insert 10101

Diagram

Description automatically generated

**Question 2:**

Consider the following records of question 1: (Again Digits should be considered from left to right)

**00001, 10000, 10100, 00111, 11011, 11101, 10010, 01111, 10101**

Load the records into files using Dynamic Hashing Scheme. You can put two records per block. Show the directory at each step, and the global and local depths.

Insert 00001, Insert 10000, Insert 10100, Insert 00111

Diagram

Description automatically generated

Continued..

Insert 11011, Insert 11101

Diagram, schematic

Description automatically generated

Insert 10010

Diagram, schematic

Description automatically generated

Insert 01111, Insert 10101

Diagram, schematic

Description automatically generated

**Question 3:**

Insert the following into B+ tree of order **3**. Show your work step by step with proper illustration of pointers as shown in pages 47-54 in multi-way trees lecture

**90, 22, 27, 24, 28, 20, 51, 63, 8, 80, 15, 71, 35, 55**

Insert 90

A picture containing chart

Description automatically generated

Insert 22

Table

Description automatically generated

Insert 27

Diagram

Description automatically generated

Insert 24

Diagram

Description automatically generated

Insert 28

Diagram

Description automatically generated

Insert 20

Diagram, engineering drawing

Description automatically generated

Insert 51

Diagram

Description automatically generated

Insert 63

Diagram

Description automatically generated

Insert 8

Diagram

Description automatically generated

Insert 80Diagram, engineering drawing

Description automatically generated

Insert 15

Diagram, engineering drawing

Description automatically generated

Insert 71

Diagram, engineering drawing

Description automatically generated

Insert 35

Diagram

Description automatically generated

Insert 55

Diagram

Description automatically generated

**Question 4:**

Insert the following into B\_tree of order **3**. Show your work step by step with proper illustration of pointers as shown in pages 47-54 in multi-way trees lecture

**2, 99, 9, 71, 16, 11, 15, 13, 91, 92, 94**

Insert 2 A picture containing box and whisker chart

Description automatically generated

Insert 99 Table

Description automatically generated

Insert 9 Table

Description automatically generated🡪 Diagram

Description automatically generated

Insert 71 Diagram, shape

Description automatically generated

Insert 16Diagram

Description automatically generated🡪Diagram

Description automatically generated

Insert 11Diagram

Description automatically generated

Insert 15 Diagram

Description automatically generated🡪

Continued..

Diagram

Description automatically generated🡪

Diagram, shape, rectangle

Description automatically generated

Insert 13 Diagram

Description automatically generated

Insert 91Diagram

Description automatically generated

Insert 92 Diagram, shape, rectangle

Description automatically generated 🡪

Diagram

Description automatically generated

Insert 94 Diagram

Description automatically generated

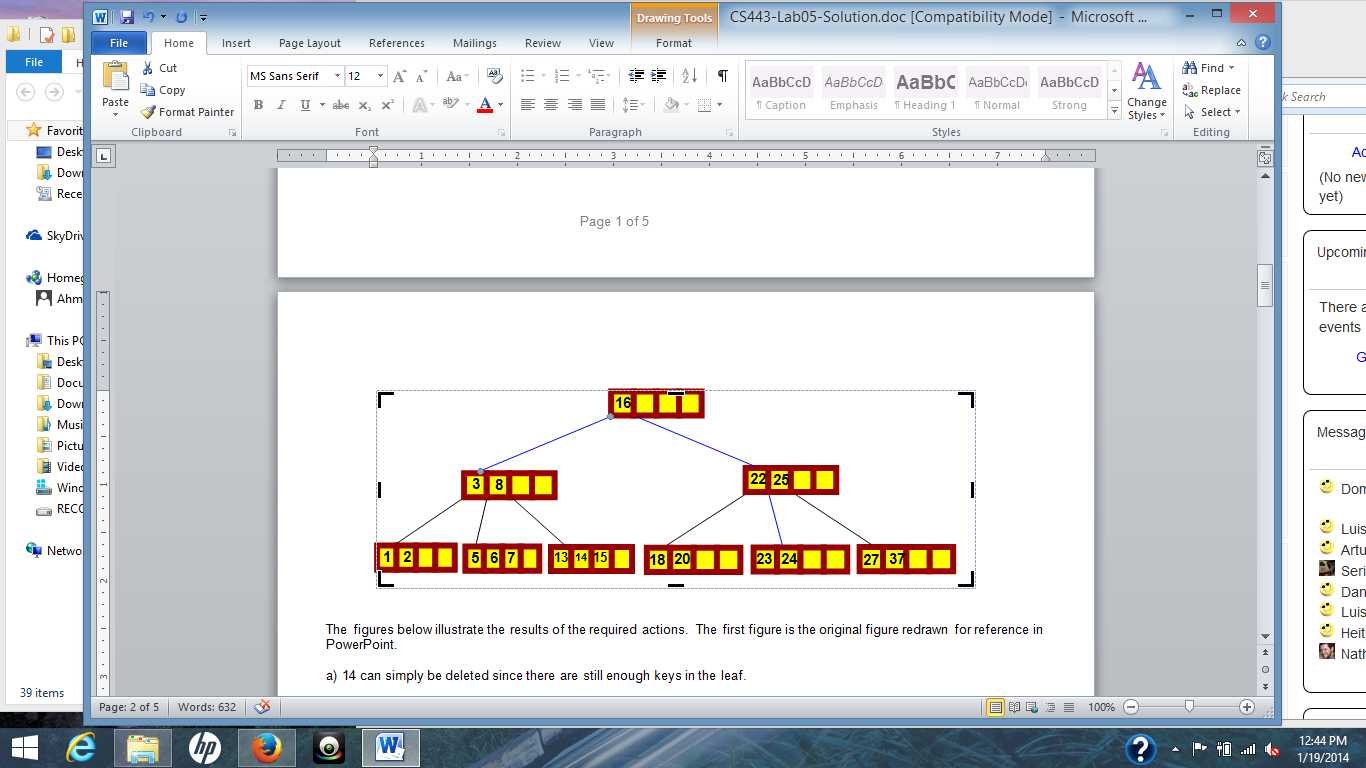
**Question 5:**

Consider the following B-tree.

a) Redraw the tree after deleting 14.

b) Again, redraw the tree after deleting 15.

c) Again, redraw the tree after deleting 25.



1. Diagram

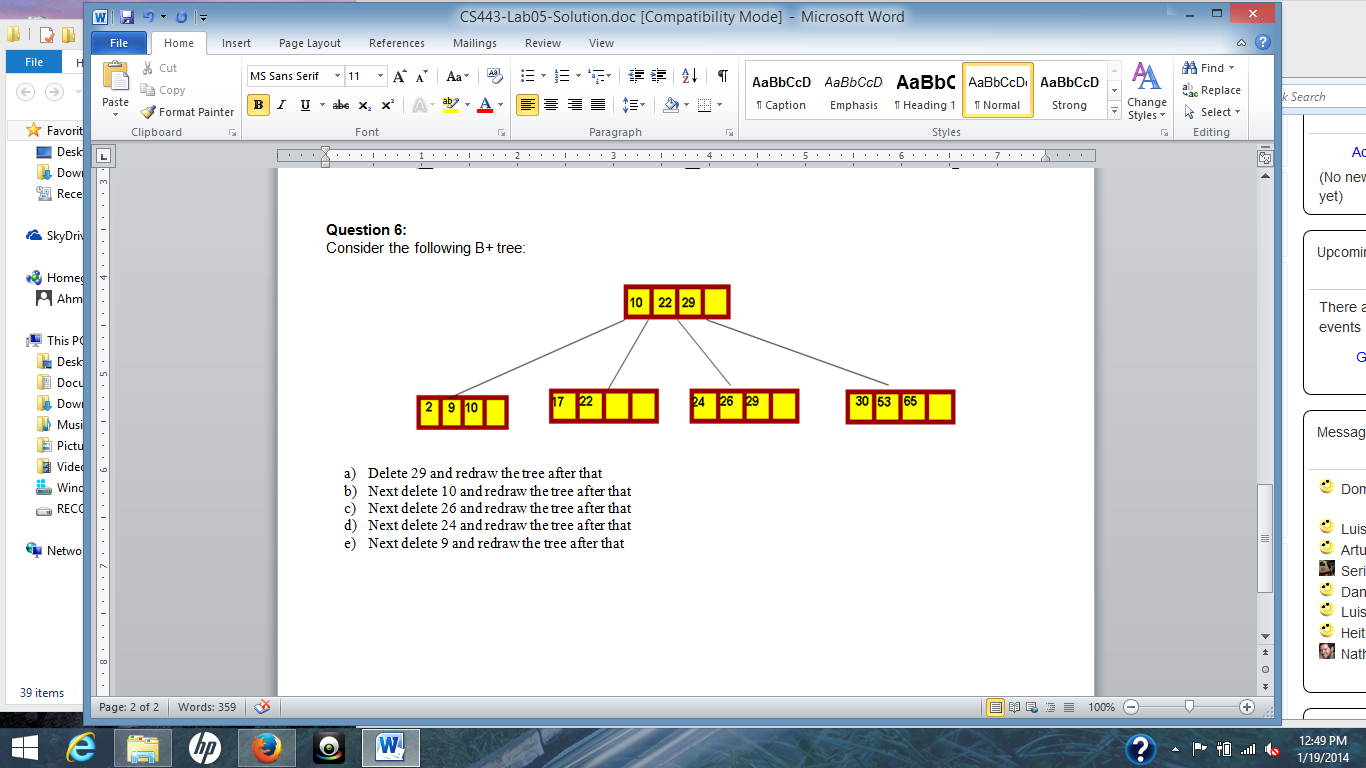
   Description automatically generated
2. Diagram

   Description automatically generated
3. Diagram

   Description automatically generated with medium confidence

**Question 6:**

Consider the following B+ tree:



1. Delete 29 and redraw the tree after that

Diagram

Description automatically generated

1. Next delete 10 and redraw the tree after that

Diagram

Description automatically generated

1. Next delete 26 and redraw the tree after that

Diagram

Description automatically generated

Continued..

1. Next delete 24 and redraw the tree after that

A picture containing calendar

Description automatically generated

1. Next delete 9 and redraw the tree after that

Diagram

Description automatically generated