

QUIZ 2
COMP6048 – Data Structures Even 2019 / 2020
VAR 8

Notes :

1. There are **2 parts** in this quiz, Essay and Case.
2. For essay problem:
 - a. You are required to solve it using by **handwritten on a paper**
 - b. Subsequently, your essay answers **should be converted in 1 pdf file** using this format: ***nim.pdf***
 - c. The lecturers won't accept any answers using word processing application in order to prevent copy-paste answers in a last minute
3. For case problem:
 - a. **The submission code is in .cpp file** and using this format: ***nim.cpp***
4. All your answers **either essay (nim.pdf) or case (nim.cpp) should be zipped and submitted through** the platform that your lecturer set. Other than that, the submission won't be accepted for any reasons. (**Note : Please zip both files using this format: nim.zip**)
5. **Your Quiz will be marked as 0 if any plagiarism is found**

I. Essay (60%)

When deleting, always take the replacement value from **leftmost of right** children.

Write down every step for insert and delete happen in all simulation tree below.

1. [20%] Given Red Black Tree in the figure 1 below:

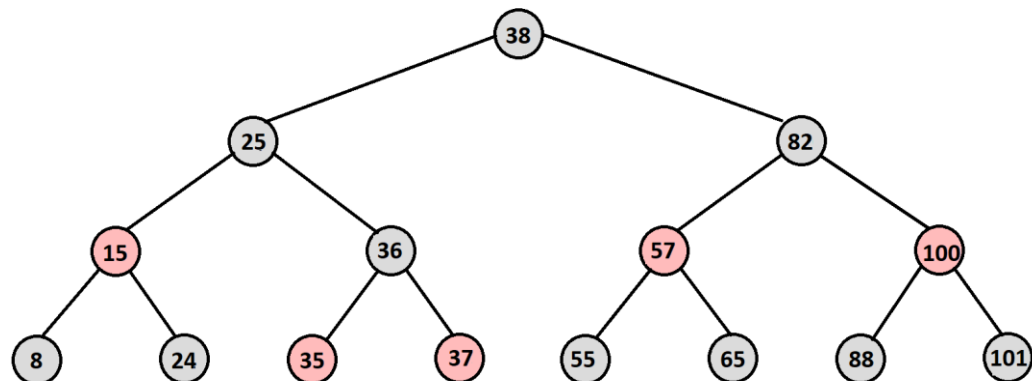


Figure 1 Red Black Tree

- a. [10%] Please insert the following numbers: **3, 1, 10, 30** and **33** subsequently!

QUIZ 2
COMP6048 – Data Structures Even 2019 / 2020
VAR 8

- b.[10%] Refer to resulting tree in 1(a), please delete the following numbers: **15, 38, 8, 30** and **36** subsequently!

2. [20%] Given B-Tree order 3 in the figure 2 below:

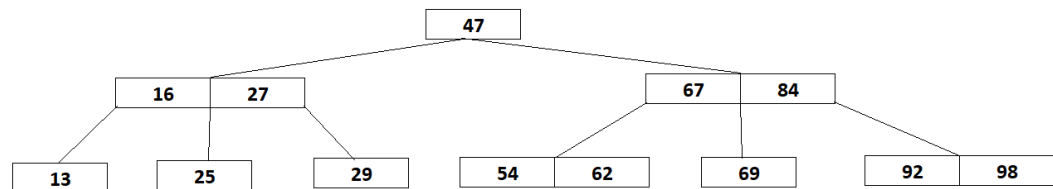


Figure 2 B-Tree Order 3

- a.[10%] Please insert the following numbers: **10, 14, 75, 100** and **80** subsequently!
- b.[10%] Refer to resulting tree in 2(a), please delete the following numbers : **54, 67, 80, 100** and **62** subsequently!
3. [20%] Consider the graph given in Figure 3, find the shortest path from A to J using Dijkstra Algorithm. Write step by step using table and result from the table.

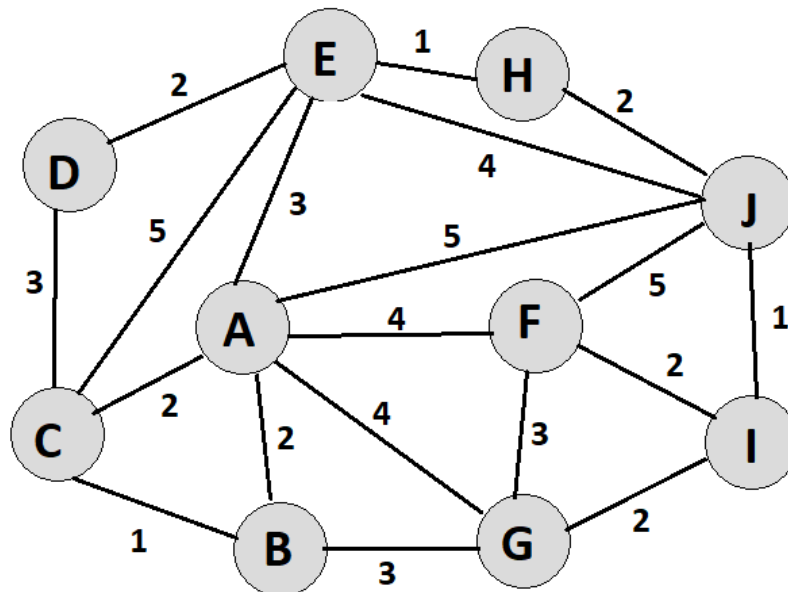


Figure 3 Graph

QUIZ 2
COMP6048 – Data Structures Even 2019 / 2020
VAR 8

II. Case (40%)

STAR Auction is an application which provides a service to user to bid the items that were auctioned. This application will be used by the **customers** to **make a bid for an item**. As a developer, you are asked to develop this application (must be implemented using **AVL Tree**) with requirements below:

- a. Print all data and print menu

Print all data and print menu consist of:

1. Bid Item
2. Cancel Bid
3. Exit

The following is the initial data in the program:

Table 1 Initial Data

Item ID	Last Price
0004	300
0003	100
0007	500
0001	2000
0005	35000

Insert all data above into the program sequentially.

Program will display list of expenses data that stored in AVL Tree sorted by **Item ID ascending**.

STAR Auction	
=====	
Item ID	Last Price
=====	
0001	\$2000
0003	\$100
0004	\$300
0005	\$35000
0007	\$500
=====	
1. Bid Item	
2. Cancel Bid	
3. Quit	
Enter Your Choice:	

Figure 4 Main Menu

QUIZ 2
COMP6048 – Data Structures Even 2019 / 2020
VAR 8

b. Bid Item

- Validate input **item ID** between 1 and 9999.
- Validate input **bid** between \$100 and \$100000.
 - If **Item ID** existed, validate input **bid** must be **higher** than **last bid**.
- Update current bid with inputted bid.

```
Item ID [1-9999]:1234
Bid [$100 - $100000]: $3790
Success Add New Bid!
```

Figure 5 Bid Item Menu

STAR Auction	
Item ID	Last Price
0001	\$2000
0003	\$100
0004	\$300
0005	\$35000
0007	\$500
1234	\$3790

Figure 6 After New Bid Added

```
Item ID [1-9999]:5
Bid [$100 - $100000]: $37000
Success Update New Price!
```

Figure 7 Add new Bid from Existed Item ID

STAR Auction	
Item ID	Last Price
0001	\$2000
0003	\$100
0004	\$300
0005	\$37000
0007	\$500
1234	\$3790

Figure 8 After Bid Price Updated

QUIZ 2
COMP6048 – Data Structures Even 2019 / 2020
VAR 8

c. Cancel Bid

When 2nd menu is chosen, user can cancel bid from the list. The program will ask user to input **item ID** that want to be cancel.

```
Item ID [1-9999]:4
Item ID succesfully canceled
```

Figure 9 Menu Cancel Bid

STAR Auction	
Item ID	Last Price
0001	\$2000
0003	\$100
0005	\$300
0007	\$500
1234	\$3790

Figure 10 After Item ID cancelled

d. Exit

When 3rd menu is chosen, then close the program.

-- Good Luck --