|  |
| --- |
| **Declaration of Original Work**  By submitting the answer script of this assignment to the subject lecturer through Moodle Centralized Group, you hereby declare that the work in the answer sheet is completely your own work. No part of the answer sheet is taken from other people’s work without giving them credit. All references have been clearly cited.  You understand that an infringement of this declaration leaves you subject to disciplinary actions such as mark deduction, disqualification or even expulsion by the College.  If necessary, students may be invited to provide more information on their submission. |

*(Please refer to the relevant section(s) on plagiarism of the Student Handbook.)*

**Instructions to Students:**

1. Please refer to assignment specification for the submission method
2. Show all your work clearly and neatly. Marks will be deducted for untidy work.

**Answer ALL questions.**

**Answer for Question 1**

A) + \* a b \* c d 🡺 + \* 95 56 \* 60 1

B) a \* b + c \* d 🡺 95 \* 56 + 60 \* 1

C) 5380

**Answer for Question 2**

A)

Text

Description automatically generated

B)

Text

Description automatically generated

C)

Text

Description automatically generated

Text

Description automatically generated

Test case 1:

Text

Description automatically generated



Test case 2:

A screenshot of a computer

Description automatically generated with medium confidence



Test case 3:

Text

Description automatically generated



**Answer for Question 3**

A)i)

Text

Description automatically generated

ii)

Text

Description automatically generated

B)

A screenshot of a computer

Description automatically generated with medium confidence

searchAllPath() output:

Text

Description automatically generated

C)

Text

Description automatically generated

searchPathByWeight() output:



D)

searchAllPath() disadvantage:

As the searchAllPath() method walks through all the nodes of the graph, time complexity is higher(i.e. O(n)), efficiency decreases when the number of nodes grows.

searchAllPath() advantage:

As all nodes have been traversed, weight of every path has been listed out, the dedicated path with least weight can be chosen easily.

searchPathByWeight() advantage:

In this method, only one path has been traversed, the time complexity will only remain O(log n) in this structure

searchPathByWeight() disadvantage:

Since the graph is not a BST, it is not guaranteed that the chosen path must be the one with least weight. Test case 1 demonstrates this argument.

Test case 1 of question 3:

Text

Description automatically generated

Graphical user interface, text

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Test case 1 output:

Text

Description automatically generated

Path weight of searchPathByWeight: 82

Path with least weight in searchAllPath: 30

Test case 2:

Text

Description automatically generated

Graphical user interface, text

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Test case 2 output:

Text

Description automatically generated

**Answer for Question 4**

A)

a = 95

b = 56

c = 60

d = 1

e = 96

f = 50

g = 61

A picture containing sky, electronics, white, wire

Description automatically generated

B)

A picture containing text, white

Description automatically generated

C)

Insert order:

g = 61🡺 b = 56 🡺 a = 95 🡺 f = 50 🡺 c = 60 🡺 e = 96 🡺d = 1