A picture containing circle

Description automatically generated

Faculty of Computers and Artificial Intelligence

Software Engineering Program

Software Testing Course

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| --- |
| **public** **boolean** add**(**T element**){**  **if** **(**size **>=** capacity**)** **{**  capacity **+=** **10;**  Object**[]** newArray **=** **new** Object**[**capacity**];**  **for** **(int** i **=** **0;** i **<** size**;** i**++)**  newArray**[**i**]** **=** elements**[**i**];**  elements **=** newArray**;**  **}**  elements**[**size**]** **=** element**;**  size**++;**  **return** **true;**  **}** |

**Task 1: Control Graph Flow and Control Data Flow**

For your first task you will study the code for class DynamicList,then you are required to deliver the following for the **“Add”** function:

Shape, arrow

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**• The graph showing the execution flow of the code.**

|  |
| --- |
| *// Node 1 -Initial Node-:*  If (size >= capacity)  *// Node 2:*  capacity += 10;  Object[] newArray = **new** Object[capacity];  **for** (int i = 0  *// Node 3:*  i < size;  *// Node 4:*  newArray[i] = elements[i];  *// Node 5:*  i++;  *// Node 6:*  elements = newArray;  *// Node 7 -Final Node-:*  elements[size] = element;  size++;  **return** **true**; |

**• Edge, Edge-Pair, Simple Path and Prime path coverages.**

**Node Coverage:**

TR = {1, 2, 3, 4, 5, 6, 7}.

Test Paths = {(1,2,3,4,5,3,6,7), (1,7)}.

**Edge Coverage:**

TR = {(1,2), (1,7), (2,3), (3,4), (3,6), (4,5), (5,3), (6,7)}.

Test Paths = {(1,2,3), (2,3,4), (2,3,6), (3,4,5), (3,6,7), (4,5,3), (5,3,6)}.

**Simple Path:** {(1), (2), (3), (4), (5), (6), (7)!, (1,2), (1,7)!, (2,3), (3,4), (3,6), (4,5), (5,3), (6,7)!.

(1,2,3), (2,3,4), (3,4,5), (3,6,7)!, (4,5,3), (5,3,6), (1,2,3,4), (2,3,4,5), (2,3,6,7),

(3,4,5,3)\*, (4,5,3,6), (5,3,6,7)!, (1,2,3,4,5), (4,5,3,6,7)!}

**Prime Path:** {(2,3,6,7), (3,4,5,3), (1,2,3,4,5), (4,5,3,6,7)}

• Defs and Uses for each node.

|  |  |  |
| --- | --- | --- |
| **Node** | **Def** | **Use** |
| 1 |  | Size, capacity |
| 2 | newArray, i, capacity | newArray, capacity, i |
| 3 |  | i, size |
| 4 | newArray | i, size, elements |
| 5 | i | i |
| 6 | elements | element, newArray |
| 7 | elements, size | elements, element, size |

• Du-pairs, Du-paths for each variable.

• All-defs, all-uses and all-defuse paths coverage.