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College of Information Systems and Technology Management (CISTM)

ICC 0104-1 – Data Structures and Algorithms

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Group 4: Searching

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BSCS 1-1

I. Main Menu

Source Code in Java

Singly.java > Singly > scanner

```java
import java.util.Scanner;

class Node {
    String studno;
    String studname;
    String studcrsyr;
    float GWA;
    Node next;

    public Node(String studno, String studname, String studcrsyr, float GWA) {
        this.studno = studno;
        this.studname = studname;
        this.studcrsyr = studcrsyr;
        this.GWA = GWA;
        this.next = null;
    }
}

public class Singly {
    Node start;
    Scanner scanner = new Scanner(System.in);

    Run | Debug
    public static void main(String[] args) {
        Singly srm = new Singly();
        int choice;

        while (true) {
            srm.MainMenu();
            System.out.print(s:"Enter your choice: ");
            choice = srm.scanner.nextInt();
            srm.scanner.nextLine();

            switch (choice) {
                case 1:
                    srm.CreateList();
                    break;
                case 2:
                    srm.DisplayList();
                    break;
                case 3:
                    srm.AddStart();
                    System.out.println(x:"New record is added!");
                    break;
                case 4:
                    srm.AddEnd();
                    System.out.println(x:"New record is added!");
                    break;
                case 5:
                    srm.AddBef();
                    System.out.println(x:"New record is added!");
                    break;
```

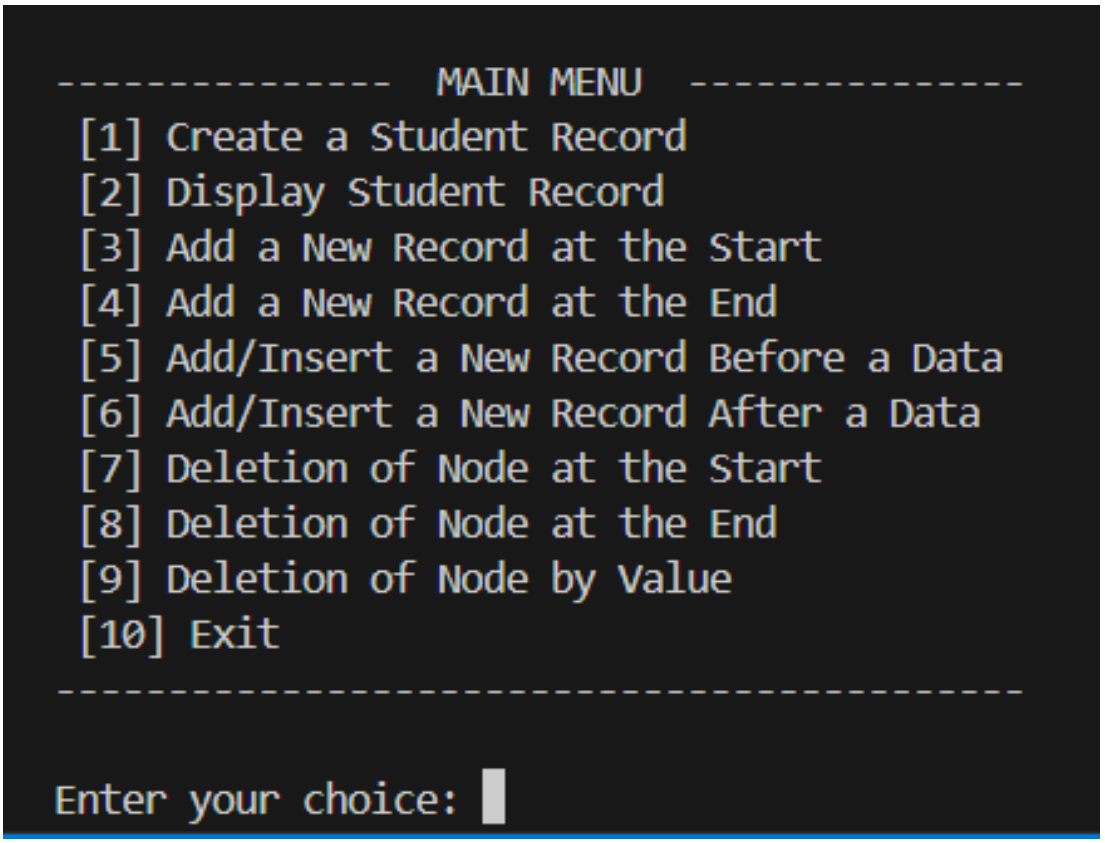
```
                case 6:
                    srm.AddAft();
                    System.out.println(x:"New record is added!");
                    break;
                case 7:
                    srm.DelStart();
                    System.out.println(x:"Successfully deleted!");
                    break;
                case 8:
                    srm.DelEnd();
                    System.out.println(x:"Successfully deleted!");
                    break;
                case 9:
                    srm.DelVal();
                    break;
                case 10:
                    srm.scanner.close();
                    return;
                default:
                    System.out.println(x:"Invalid Choice!!!");
                    break;
            }
        }
    }

```

```
    void MainMenu() {
        System.out.println(x:"\n---------------  MAIN MENU  ---------------");
        System.out.println(x:" [1] Create a Student Record");
        System.out.println(x:" [2] Display Student Record");
        System.out.println(x:" [3] Add a New Record at the Start");
        System.out.println(x:" [4] Add a New Record at the End");
        System.out.println(x:" [5] Add/Insert a New Record Before a Data");
        System.out.println(x:" [6] Add/Insert a New Record After a Data");
        System.out.println(x:" [7] Deletion of Node at the Start");
        System.out.println(x:" [8] Deletion of Node at the End");
        System.out.println(x:" [9] Deletion of Node by Value");
        System.out.println(x:" [10] Exit");
        System.out.println(x:"----------------------------------------\n");
    }

```

Output


--------------- MAIN MENU ---------------
[1] Create a Student Record
[2] Display Student Record
[3] Add a New Record at the Start
[4] Add a New Record at the End
[5] Add/Insert a New Record Before a Data
[6] Add/Insert a New Record After a Data
[7] Deletion of Node at the Start
[8] Deletion of Node at the End
[9] Deletion of Node by Value
[10] Exit

Enter your choice:

II. Creation of Single/Singly Linked List

Source Code in Java

```java
void CreateList() {
    Node temp = null;
    char choice;

    do {
        System.out.println(x:"\n------------------  CREATING A STUDENT RECORD  ------------------\n");
        System.out.print(s:"Student Number: ");
        String studno = scanner.nextLine();
        System.out.print(s:"Student Name: ");
        String studname = scanner.nextLine();
        System.out.print(s:"Course and Year: ");
        String studcrsyr = scanner.nextLine();
        System.out.print(s:"GWA: ");
        float GWA = scanner.nextFloat();
        scanner.nextLine();

        Node newNode = new Node(studno, studname, studcrsyr, GWA);

        if (start == null) {
            start = newNode;
        } else {
            temp.next = newNode;
        }

        temp = newNode;

        System.out.print(s:"Add another record? [Y/N]: ");
        choice = scanner.nextLine().charAt(index:0);
    } while (Character.toUpperCase(choice) == 'Y');
}
```

Output

```
------------------  CREATING A STUDENT RECORD  ------------------

Student Number: 202334067
Student Name: Ramyll
Course and Year: BSCS 1-1
GWA: 1.00
Add another record? [Y/N]: Y

------------------  CREATING A STUDENT RECORD  ------------------

Student Number: 202334080
Student Name: Ram
Course and Year: BSCS 1-2
GWA: 1.25
Add another record? [Y/N]: N
```

III. Traversal of Single/Singly Linked List

Source Code in Java

```java
void DisplayList() {
    Node current = start;
    int ctr = 1;

    System.out.println(x:"\n-----------------------------------  STUDENT'S GWA REPORT  ------------------------------------------

    if (current == null) {
        System.out.println(x:"\nStudent Record is empty!");
    } else {
        System.out.printf(format:"%-15s%-25s%-25s%-15s\n", ...args:"Student No.", "Student Name", "Course & Year", "GWA");

        while (current != null) {
            System.out.printf(format:"%-15s%-25s%-25s%-15.2f\n", current.studno, current.studname, current.studcrsyr, current.GWA);
            current = current.next;
            ctr++;
        }
    }

    System.out.println(x:"-----------------------------------------------------------------------------------------------------\n
}
```

```java
void AddStart() {
    System.out.println(x:"\n-----------------  ADDING A NEW RECORD AT THE START  -----------------\n");
    System.out.print(s:"Student Number: ");
    String studno = scanner.nextLine();
    System.out.print(s:"Student Name: ");
    String studname = scanner.nextLine();
    System.out.print(s:"Course & Year: ");
    String studcrsyr = scanner.nextLine();
    System.out.print(s:"GWA: ");
    float GWA = scanner.nextFloat();
    scanner.nextLine();

    Node newNode = new Node(studno, studname, studcrsyr, GWA);
    newNode.next = start;
    start = newNode;
}
```

Output

```
-----------------------------------  STUDENT'S GWA REPORT  ------------------------------------------

Student No.     Student Name              Course & Year             GWA
202334067       Ramyll                    BSCS 1-1                  1.00
202334080       Ram                       BSCS 1-2                  1.25
-----------------------------------------------------------------------------------------------------
```

IV. Adding a New Node at the Start

Source Code in Java

```
144     void AddStart() {
145         System.out.println(x:"\n----------------  ADDING A NEW RECORD AT THE START  ----------------\n");
146         System.out.print(s:"Student Number: ");
147         String studno = scanner.nextLine();
148         System.out.print(s:"Student Name: ");
149         String studname = scanner.nextLine();
150         System.out.print(s:"Course & Year: ");
151         String studcrsyr = scanner.nextLine();
152         System.out.print(s:"GWA: ");
153         float GWA = scanner.nextFloat();
154         scanner.nextLine();
155 
156         Node newNode = new Node(studno, studname, studcrsyr, GWA);
157         newNode.next = start;
158         start = newNode;
159     }
160 
```

Output:

```
----------------  ADDING A NEW RECORD AT THE START  ----------------

Student Number: 202334057
Student Name: Lly
Course & Year: BSCS 1-3
GWA: 1.25
New record is added!
```

```
-------------------------------------  STUDENT'S GWA REPORT  -------------------------------------

Student No.     Student Name            Course & Year           GWA
202334057       Lly                     BSCS 1-3                1.25
202334067       Ramyll                  BSCS 1-1                1.00
202334080       Ram                     BSCS 1-2                1.00
-------------------------------------------------------------------------------------------------
```

V. Adding a New Node at the End

Source Code in Java

```java
void AddEnd() {
    System.out.println(x:"\n----------------  ADDING A NEW RECORD AT THE END  ----------------\n");
    System.out.print(s:"Student Number: ");
    String studno = scanner.nextLine();
    System.out.print(s:"Student Name: ");
    String studname = scanner.nextLine();
    System.out.print(s:"Course & Year: ");
    String studcrsyr = scanner.nextLine();
    System.out.print(s:"GWA: ");
    float GWA = scanner.nextFloat();
    scanner.nextLine();

    Node newNode = new Node(studno, studname, studcrsyr, GWA);
    if (start == null) {
        start = newNode;
    } else {
        Node temp = start;
        while (temp.next != null) {
            temp = temp.next;
        }
        temp.next = newNode;
    }
}

```

Output

```
----------------  ADDING A NEW RECORD AT THE END  ----------------

Student Number: 202334057
Student Name: Lly
Course & Year: BSCS 1-3
GWA: 1.25
New record is added!
```

```
------------------------------------  STUDENT'S GWA REPORT  ------------------------------------------

Student No.     Student Name            Course & Year           GWA
202334067       Ramyll                  BSCS 1-1                1.00
202334080       Ram                     BSCS 1-2                1.00
202334057       Lly                     BSCS 1-3                1.25
-------------------------------------------------------------------------------------------------------
```

VI. Adding/Insertion of New Node Before a Node (data)

Source Code in Java

```java
void AddBef() {
    System.out.println("\n----------  ADDING A NEW RECORD BEFORE A GIVEN STUDENT RECORD  ----------\n");

    if (start == null) {
        System.out.println("Student Record is empty!");
        return;
    }

    System.out.print("Enter the Student Number before which you want to add the new record: ");
    String studentNoToFind = scanner.nextLine();

    Node current = start;
    Node prev = null;

    while (current != null && !current.studno.equals(studentNoToFind)) {
        prev = current;
        current = current.next;
    }

    if (current == null) {
        System.out.println("Error: The specified student record not found.");
        return;
    }
```

```java

    System.out.println("\n----------  INSERT THE NEW RECORD  ----------");
    System.out.print("Student Number: ");
    String studno = scanner.nextLine();
    System.out.print("Student Name: ");
    String studname = scanner.nextLine();
    System.out.print("Course and Year: ");
    String studcrsyr = scanner.nextLine();
    System.out.print("GWA: ");
    float GWA = scanner.nextFloat();
    scanner.nextLine();

    Node newRecord = new Node(studno, studname, studcrsyr, GWA);
    if (prev == null) {
        newRecord.next = start;
        start = newRecord;
    } else {
        newRecord.next = current;
        prev.next = newRecord;
    }

    System.out.println("New Student Record has been added before the specified Student Number.");
}
```

Output

```
-------------------------------------  STUDENT'S GWA REPORT  -----------------------------------------

Student No.     Student Name            Course & Year           GWA
202334067       Ramyll                  BSCS 1-1                1.00
202334080       Ram                     BSCS 1-2                1.00
-------------------------------------------------------------------------------------------------------
```

```
----------------  ADDING A NEW RECORD BEFORE A GIVEN STUDENT RECORD  ----------------

Enter the Student Number before which you want to add the new record: 202334080

------------------------------  INSERT THE NEW RECORD  ------------------------------
Student Number: 202334057
Student Name: Lly
Course and Year: BSCS 1-3
GWA: 1.25
New Student Record has been added before the specified Student Number.
New record is added!
```

```
-----------------------------------  STUDENT'S GWA REPORT  -----------------------------------------

Student No.     Student Name            Course & Year           GWA
202334067       Ramyll                  BSCS 1-1                1.00
202334057       Lly                     BSCS 1-3                1.25
202334080       Ram                     BSCS 1-2                1.00
-------------------------------------------------------------------------------------------------
```

VII. Adding/Insertion of New Node After a Node (data)

Source Code in Java

```java
    void AddAft() {
        System.out.println("\n----------------  ADDING A NEW RECORD AFTER A GIVEN STUDENT RECORD  ----------------\n");

        if (start == null) {
            System.out.println("Student Record is empty!");
            return;
        }

        System.out.print("Enter the Student Number after which you want to add the new record: ");
        String studentNoToFind = scanner.nextLine();

        Node current = start;

        while (current != null && !current.studno.equals(studentNoToFind)) {
            current = current.next;
        }

        if (current == null) {
            System.out.println("Error: The specified student record not found.");
            return;
        }

        System.out.println("\n------------------------------  INSERT THE NEW RECORD  ------------------------------");
        System.out.print("Student Number: ");
        String studno = scanner.nextLine();
        System.out.print("Student Name: ");
        String studname = scanner.nextLine();
        System.out.print("Course and Year: ");
        String studcrsyr = scanner.nextLine();
        System.out.print("GWA: ");
        float GWA = scanner.nextFloat();
        scanner.nextLine();

        Node newRecord = new Node(studno, studname, studcrsyr, GWA);
        newRecord.next = current.next;
        current.next = newRecord;

        System.out.println("New Student Record has been added after the specified Student Number.");
    }
```

Output

```
-----------------------------------  STUDENT'S GWA REPORT  -----------------------------------------

Student No.     Student Name            Course & Year           GWA
202334067       Ramyll                  BSCS 1-1                1.00
202334080       Ram                     BSCS 1-2                1.25
-------------------------------------------------------------------------------------------------
```

```
----------------  ADDING A NEW RECORD AFTER A GIVEN STUDENT RECORD  ----------------

Enter the Student Number after which you want to add the new record: 202334067

------------------------------  INSERT THE NEW RECORD  ------------------------------
Student Number: 202334057
Student Name: Lly
Course and Year: BSCS 1-3
GWA: 1.50
New Student Record has been added after the specified Student Number.
New record is added!
```

```
------------------------------------  STUDENT'S GWA REPORT  ------------------------------------------

Student No.     Student Name            Course & Year           GWA
202334067       Ramyll                  BSCS 1-1                1.00
202334057       Lly                     BSCS 1-3                1.50
202334080       Ram                     BSCS 1-2                1.25
-------------------------------------------------------------------------------------------------
```

VIII. Deletion of Node at the Start

Source Code in Java

```
272     void DelStart() {
273         System.out.println(x:"\n----------------  DELETING THE FIRST RECORD  ----------------\n");
274 
275         if (start == null) {
276             System.out.println(x:"Student Record is empty!");
277             return;
278         }
279 
280         start = start.next;
281 
282         System.out.println(x:"The first student record has been successfully deleted.");
283     }
284 
```

Output

```
------------------------------------  STUDENT'S GWA REPORT  ------------------------------------

Student No.     Student Name            Course & Year           GWA
202334067       Ramyll                  BSCS 1-1                1.00
202334080       Ram                     BSCS 1-2                1.00
202334057       Lly                     BSCS 1-3                1.25
-------------------------------------------------------------------------------------------------
```

```
-----------------  DELETING THE FIRST RECORD  -----------------

The first student record has been successfully deleted.
Successfully deleted!
```

```
------------------------------------  STUDENT'S GWA REPORT  ------------------------------------

Student No.     Student Name            Course & Year           GWA
202334080       Ram                     BSCS 1-2                1.00
202334057       Lly                     BSCS 1-3                1.25
-------------------------------------------------------------------------------------------------
```

IX. Deletion of Node at the End

Source Code in Java

```java
void DelEnd() {
    System.out.println(x:"\n----------------  DELETING THE LAST RECORD  ----------------\n");

    if (start == null) {
        System.out.println(x:"Student Record is empty!");
        return;
    }

    if (start.next == null) {
        start = null;
    } else {
        Node current = start;
        Node prev = null;
        while (current.next != null) {
            prev = current;
            current = current.next;
        }
        prev.next = null;
    }

    System.out.println(x:"The last student record has been successfully deleted.");
}
```

Output

```
------------------------------------  STUDENT'S GWA REPORT  ------------------------------------

Student No.     Student Name            Course & Year           GWA
202334080       Ram                     BSCS 1-2                1.00
202334057       Lly                     BSCS 1-3                1.25
-----------------------------------------------------------------------------------------------
```

```
-----------------  DELETING THE LAST RECORD  -----------------

The last student record has been successfully deleted.
Successfully deleted!
```

```
------------------------------------  STUDENT'S GWA REPORT  ------------------------------------

Student No.     Student Name            Course & Year           GWA
202334080       Ram                     BSCS 1-2                1.00
-----------------------------------------------------------------------------------------------
```

X. Deletion of Node by Value (Data)

Source Code in Java

```java
void DelVal() {
    System.out.println("\n-----------------  DELETING A RECORD BY VALUE  -----------------\n");

    if (start == null) {
        System.out.println("Student Record is empty!");
        return;
    }

    System.out.print("Enter the Student Number of the record you want to delete: ");
    String studentNoToDelete = scanner.nextLine();

    Node current = start;
    Node prev = null;

    while (current != null && !current.studno.equals(studentNoToDelete)) {
        prev = current;
        current = current.next;
    }

    if (current == null) {
        System.out.println("Error: The specified student record not found.");
        return;
    }

    if (prev == null) {
        start = start.next;
    } else {
        prev.next = current.next;
    }

    System.out.println("The student record has been successfully deleted.");
}
}
```

Output

```
-----------------------------------  STUDENT'S GWA REPORT  -----------------------------------

Student No.     Student Name            Course & Year           GWA
202334067       Ramyll                  BSCS 1-1                1.00
202334057       Lly                     BSCS 1-3                1.50
202334080       Ram                     BSCS 1-2                1.25
-------------------------------------------------------------------------------------------------
```

```
-----------------  DELETING A RECORD BY VALUE  -----------------

Enter the Student Number of the record you want to delete: 202334057
The student record has been successfully deleted.
```

```
-----------------------------------  STUDENT'S GWA REPORT  -----------------------------------

Student No.     Student Name            Course & Year           GWA
202334067       Ramyll                  BSCS 1-1                1.00
202334080       Ram                     BSCS 1-2                1.25
-------------------------------------------------------------------------------------------------
```