

```

1 package linear;
2
3 import java.util.Scanner;
4
5 public class dreo_runtime {
6     public static void main(String[] args) {
7         Scanner s = new Scanner(System.in);
8         int[] id = new int[1000000];
9
10        for (int i = 0; i < id.length; i++) {
11            id[i] = i;
12        }
13
14        System.out.print("Enter Student ID to search (0 - 999999): ");
15        int target = s.nextInt();
16
17        long startLinear = System.nanoTime();
18        int linearIndex = linearSearch(id, target);
19        long endLinear = System.nanoTime();
20        double linearTimeMs = (endLinear - startLinear) / 1_000_000.0;
21
22        long startBinary = System.nanoTime();
23        int binaryIndex = binarySearch(id, target);
24        long endBinary = System.nanoTime();
25        double binaryTimeMs = (endBinary - startBinary) / 1_000_000.0;
26
27        System.out.println("\nSearch for Student ID: " + target);
28        if (linearIndex != -1) {
29            System.out.println("Linear Search Result: Found at index " + linearIndex);
30        } else {
31            System.out.println("Linear Search Result: Not found");
32        }
33        System.out.println("Linear Search Time (ms): " + linearTimeMs);
34
35        if (binaryIndex != -1) {
36            System.out.println("Binary Search Result: Found at index " + binaryIndex);
37        } else {
38            System.out.println("Binary Search Result: Not found");
39        }
40        System.out.printf("Binary Search Time (ms): " + binaryTimeMs);
41    }
42
43    public static int linearSearch(int[] arr, int key) {
44        for (int i = 0; i < arr.length; i++) {
45            if (arr[i] == key) {
46                return i;
47            }
48        }
49        return -1;
50    }
51
52    public static int binarySearch(int[] arr, int key) {
53        int low = 0, high = arr.length - 1;
54        while (low <= high) {
55            int mid = (low + high) / 2;
56            if (arr[mid] == key)
57                return mid;
58            else if (arr[mid] < key)
59                low = mid + 1;
60            else
61                high = mid - 1;
62        }
63        return -1;
64    }
65 }
66

```

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<terminated> dreo_runtime [Java Application] C:\Users\John Paul\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_23.0.2.v20250131-0604\jre\bin\javaw.exe (May 20, 2025)
Enter Student ID to search (0 - 999999): 10000

Search for Student ID: 10000
Linear Search Result: Found at index 10000
Linear Search Time (ms): 0.1151
Binary Search Result: Found at index 10000
Binary Search Time (ms): 0.0285

```