```
import java.util.Scanner;

public class ShellSortDemo {

    // Method to perform Shell Sort
    public static void shellSort(int[] arr) {
        int n = arr.length;

        // Start with a big gap, then reduce the gap
        for (int gap = n / 2; gap > 0; gap /= 2) {
            // Do a gapped insertion sort
            for (int i = gap; i < n; i++) {
                int temp = arr[i];
                int j;

                for (j = i; j >= gap && arr[j - gap] > temp; j -= gap) {
                    arr[j] = arr[j - gap];
                }

                arr[j] = temp;
            }
        }
    }

    // Method to display the array
    public static void display(int[] arr) {
        System.out.print("Array: ");
        for (int num : arr)
            System.out.print(num + " ");
        System.out.println();
    }
```

```
// Method to take input from user
public static int[] inputArray(Scanner sc) {
    System.out.print("Enter number of elements: ");
    int n = sc.nextInt();
    int[] arr = new int[n];
    System.out.println("Enter the elements:");
    for (int i = 0; i < n; i++)
        arr[i] = sc.nextInt();
    return arr;
}

// Main method with menu
public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    int[] array = null;
    int choice;

    do {
        System.out.println("\n--- Shell Sort Menu ---");
        System.out.println("1. Input Array");
        System.out.println("2. Display Array");
        System.out.println("3. Perform Shell Sort");
        System.out.println("4. Exit");
        System.out.print("Enter your choice: ");
        choice = sc.nextInt();

        switch (choice) {
            case 1:
                array = inputArray(sc);
                break;
```

```
            case 2:
                if (array != null)
                    display(array);
                else
                    System.out.println("Array not initialized. Please input the array first.");
                break;

            case 3:
                if (array != null) {
                    shellSort(array);
                    System.out.println("Array sorted using Shell Sort.");
                } else {
                    System.out.println("Array not initialized. Please input the array first.");
                }
                break;

            case 4:
                System.out.println("Exiting program...");
                break;

            default:
                System.out.println("Invalid choice. Please try again.");
        }

    } while (choice != 4);

    sc.close();
  }
}
```