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Batch **: 2**

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**Data Structures Lab Assignment**

**QUESTION : WAP to implement Insertion sort, Bubble Sort and selection Sort on 1D array of Student structure (contains student\_name, student\_roll\_no, total\_marks ), with key as student\_roll\_no. and count the number of swap performed.**

#include <stdio.h>

typedef struct {

char name[50];

int roll\_no;

float marks;

} Student;

int main() {

int n, choice, swapCount;

printf("Enter number of students: ");

scanf("%d", &n);

Student students[n];

for (int i = 0; i < n; i++) {

printf("\nEnter details for Student %d:\n", i + 1);

printf("Name: ");

scanf("%s", students[i].name);

printf("Roll No: ");

scanf("%d", &students[i].roll\_no);

printf("Marks: ");

scanf("%f", &students[i].marks);

}

do {

printf("\nMenu:\n");

printf("1. Insertion Sort\n");

printf("2. Bubble Sort\n");

printf("3. Selection Sort\n");

printf("4. Exit\n");

printf("Enter your choice: ");

scanf("%d", &choice);

swapCount = 0;

switch (choice) {

case 1:

for (int i = 1; i < n; i++) {

Student temp = students[i];

int j = i - 1;

while (j >= 0 && students[j].roll\_no > temp.roll\_no) {

students[j + 1] = students[j];

j--;

swapCount++;

}

students[j + 1] = temp;

}

printf("\nSorted using Insertion Sort:\n");

break;

case 2:

for (int i = 0; i < n - 1; i++) {

for (int j = 0; j < n - i - 1; j++) {

if (students[j].roll\_no > students[j + 1].roll\_no) {

Student temp = students[j];

students[j] = students[j + 1];

students[j + 1] = temp;

swapCount++;

}

}

}

printf("\nSorted using Bubble Sort:\n");

break;

case 3:

for (int i = 0; i < n - 1; i++) {

int minIndex = i;

for (int j = i + 1; j < n; j++) {

if (students[j].roll\_no < students[minIndex].roll\_no) {

minIndex = j;

}

}

if (minIndex != i) {

Student temp = students[i];

students[i] = students[minIndex];

students[minIndex] = temp;

swapCount++;

}

}

printf("\nSorted using Selection Sort:\n");

break;

case 4:

printf("Exiting program.\n");

return 0;

default:

printf("Invalid choice. Please try again.\n");

continue;

}

printf("\n%-20s %-10s %-10s\n", "Name", "Roll No", "Marks");

for (int i = 0; i < n; i++) {

printf("%-20s %-10d %-10.2f\n", students[i].name, students[i].roll\_no, students[i].marks);

}

printf("Total swaps performed: %d\n", swapCount);

} while (choice != 4);

return 0;

}

**OUTPUT:**



 