DATA ANALYSIS AND ALGORITHMS

(23CSE211)

LAB-2

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SECTION: CSE-B

BUBBLE SORT

CODE:

```c
#include<stdio.h>
int main(){
int n;
printf("Enter the number:");
scanf("%d",&n);
int arr[n];
for(int i=0; i<n; i++){
  printf("Element %d = ",i+1);
  scanf("%d",&arr[i]);
}
printf("Initially : ");
for(int i=0; i<n; i++){
  printf("%d ",arr[i]);
}
printf("\n");
for(int i=0; i<n; i++){
  for(int j=0; j<n-1; j++){
    if(arr[j]>arr[i]){
      int temp = arr[j];
      arr[j]=arr[i];
      arr[i]=temp;
    }
  }
}
printf("Finally : ");
for(int i=0; i<n; i++){
  printf("%d ",arr[i]);
}

}
```

Output:

```
amma@amma05:~$ gcc BubbleSort.c -o BubbleSort
amma@amma05:~$ ./BubbleSort
Enter the number:5
Element 1 = 4
Element 2 = 9
Element 3 = 3
Element 4 = 2
Element 5 = 78
Initially : 4 9 3 2 78
Finally : 2 3 4 9 78 amma@amma05:~$
```

SELECTION SORT

Code:

```c
#include<stdio.h>
int main(){
int n;
printf("Enter the number:");
scanf("%d",&n);
int arr[n];
for(int i=0; i<n; i++){
  printf("Element %d = ",i+1);
  scanf("%d",&arr[i]);
}
printf("Initially : ");
for(int i=0; i<n; i++){
  printf("%d ",arr[i]);
}
printf("\n");
for(int i =0; i<n; i++){
int minindex=i;
  for(int j =i+1; j<n; j++){
    if(arr[j]<arr[i]){
      minindex=j;
    }
    int temp = arr[j];
    arr[i]=arr[j];
    arr[j]=temp;
  }
}
printf("Finally : ");
for(int i=0; i<n; i++){
  printf("%d ",arr[i]);
}
printf("\n");
}
```

OUTPUT:

```
amma@amma05:~$ gcc SelectionSort.c -o SelectionSort
amma@amma05:~$ ./SelectionSort
Enter the number:6
Element 1 = 4
Element 2 = 9
Element 3 = 6
Element 4 = 7
Element 5 = 2
Element 6 = 30
Initially : 4 9 6 7 2 30
Finally : 30 30 30 30 30 30
amma@amma05:~$
```

INSERTION SORT:

Code:

```c
int main() {
    int n, i, j, key;

    printf("Enter number of elements: ");
    scanf("%d", &n);
    int a[n];
    printf("Enter %d elements:\n ", n);
    for(i = 0; i < n; i++) {
        printf("Element %d : ",i+1);
        scanf("%d",&a[i]);
    }
    printf("\nBefore sorting: ");
    for(i = 0; i < n; i++) {
        printf("%d ", a[i]);
    }
    for(i = 1; i < n; i++) {
        key = a[i];
        j = i - 1;
        while(j >= 0 && a[j] > key) {
            a[j+1] = a[j];
            j--;
        }
        a[j+1] = key;
    }

    printf("\nAfter sorting: ");
    for(i = 0; i < n; i++) {
        printf("%d ", a[i]);
    }

    return 0;
}
```

Output:

```
amma@amma05:~$ gcc InsertionSort.c -o InsertionSort
amma@amma05:~$ ./InsertionSort
Enter number of elements: 5
Enter 5 elements:
 Element 1 : 7
Element 2 : 9
Element 3 : 35
Element 4 : 88
Element 5 : 35

Before sorting: 7 9 35 88 35
After sorting: 7 9 35 35 88 amma@amma05:~$
```

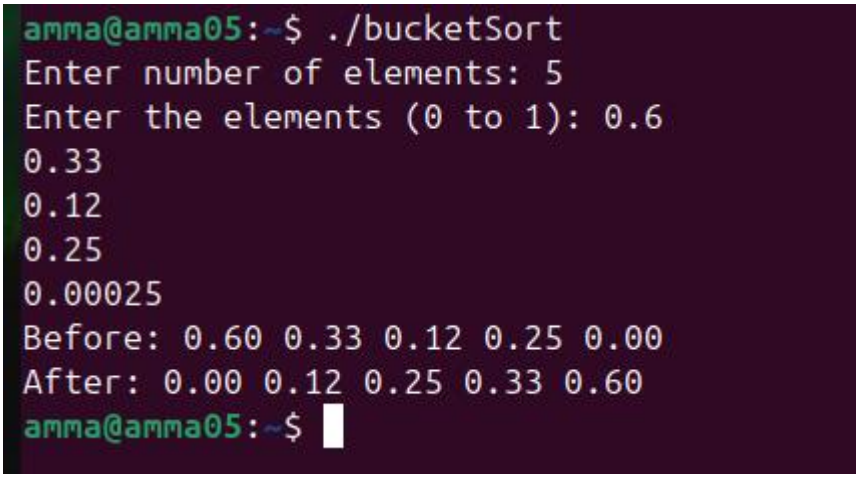
BUCKET SORT

CODE:

```c
#include <stdio.h>
int main() {
    int n, i, j, k;
    printf("Enter number of elements: ");
    scanf("%d", &n);
    float a[n];
    float b[n][n];
    int c[n];
    for (i = 0; i < n; i++) c[i] = 0;
    printf("Enter the elements (0 to 1): ");
    for (i = 0; i < n; i++){
        printf("Element %d",i+1);
         scanf("%f", &a[i]);
}
    printf("Before: ");
    for (i = 0; i < n; i++) printf("%.2f ", a[i]);
    printf("\n");
    for (i = 0; i < n; i++) {
        int d = n * a[i];
        b[d][c[d]] = a[i];
        c[d]++;
    }
    for (i = 0; i < n; i++) {
        for (j = 1; j < c[i]; j++) {
            float t = b[i][j];
            int x = j - 1;
            while (x >= 0 && b[i][x] > t) {
                b[i][x + 1] = b[i][x];
                x--;
            }
            b[i][x + 1] = t;
        }
    }
```

```c
    k = 0;
    for (i = 0; i < n; i++)
        for (j = 0; j < c[i]; j++)
            a[k++] = b[i][j];
    printf("After: ");
    for (i = 0; i < n; i++) printf("%.2f ", a[i]);
    printf("\n");
    return 0;
```

OUTPUT:



HEAP SORT

CODE:

```c
#include <stdio.h>

int main() {
    int n, i, j;

    printf("Enter number of elements: ");
    scanf("%d", &n);

    int a[n];

    printf("Enter the elements: ");
    for (i = 0; i < n; i++) scanf("%d", &a[i]);

    printf("Before: ");
    for (i = 0; i < n; i++) printf("%d ", a[i]);
    printf("\n");

    for (i = 1; i < n; i++) {
        int x = i;
        while (x > 0) {
            int p = (x - 1) / 2;
            if (a[p] < a[x]) {
                int t = a[p];
                a[p] = a[x];
                a[x] = t;
                x = p;
            } else break;
        }
    }

    for (i = n - 1; i > 0; i--) {
        int t = a[0];
        a[0] = a[i];
```

```
    }

    for (i = n - 1; i > 0; i--) {
        int t = a[0];
        a[0] = a[i];
        a[i] = t;

        int x = 0;
        while (1) {
            int l = 2 * x + 1;
            int r = 2 * x + 2;
            int big = x;

            if (l < i && a[l] > a[big]) big = l;
            if (r < i && a[r] > a[big]) big = r;

            if (big == x) break;

            t = a[x];
            a[x] = a[big];
            a[big] = t;

            x = big;
        }
    }

    printf("After: ");
    for (i = 0; i < n; i++) printf("%d ", a[i]);
    printf("\n");

    return 0;
}
```

OUTPUT:

```
amma@amma05:~$ gcc heapsort.c -o heapsort
amma@amma05:~$ ./heapsort
Enter number of elements: 5
Enter the elements: 12
6
45
1241
48
Before: 12 6 45 1241 48
After: 6 12 45 48 1241
amma@amma05:~$
```