Computing Fundamentals using Python

SUBJECT CODE : UQ25CA151A

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Computer Applications

Sorting Algorithm

Insertion Sort

- Insertion Sort builds the final sorted list one item at a time.
- It takes one element from the unsorted part and places it in its correct position in the sorted part.

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Sorting Algorithm

Working of Insertion Sort

Insertion Sorting Algorithm

1. Start
2. Repeat steps 3–7 for i = 1 to n - 1
   Set key = A[i]
   Set j = i - 1
   While j >= 0 and A[j] > key:
      Move A[j] one position ahead
      A[j + 1] = A[j]
      Decrement j → j = j - 1
3. Place the key element at its correct position:
   A[j + 1] = key
4. Continue until the entire list is sorted.
5. Stop

Insertion Sort Program

```
arr = [12, 11, 13, 5, 6]
for i in range(1, len(arr)):
    key = arr[i]      # Current element to insert
    j = i - 1
    while j >= 0 and key < arr[j]:
        arr[j + 1] = arr[j]
        j -= 1
    arr[j + 1] = key   # Place key in its correct position
print("Sorted array:", arr)
```

Sorting Algorithm

Merge Sort

It divides the list into two halves, recursively sorts each half, and then **merges** the sorted halves to produce the final sorted list.

Sorting Algorithm

Steps of Merge Sort:

- **Divide** the list into two halves (left and right).
- **Recursively sort** each half.
- **Merge** the two sorted halves into a single sorted list.

6 5 3 1 8 7 2 4

THANK YOU

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