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|  | **Manav Rachna University** |
| **Lab Assignment 2** |
| **Subject:** Analysis and Design of Algorithms **Subject Code**:  **Semester: VI** | |

**Learning Objective:** Students would be Able to implement sorting algorithms

**Learning Outcome:** To learn an assortment of sorting algorithms; and, from these, that different algorithms have properties making them appropriate for different applications

1. Write a Program to Sort a given set of elements using selection sort method and determine the time required to sort the elements.

Code:

import time

def selection\_sort(arr):

    n = len(arr)

    for i in range(n - 1):

        min\_index = i

        for j in range(i + 1, n):

            if arr[j] < arr[min\_index]:

                min\_index = j

        arr[i], arr[min\_index] = arr[min\_index], arr[i]

arr = [10, 7, 8, 9, 1, 5, 12, 3, 2, 6]

n = len(arr)

start\_time = time.time()

selection\_sort(arr)

end\_time = time.time()

time\_taken = (end\_time - start\_time)\*1000000

print("Sorted array:", arr)

print(f"Time taken to sort the elements: {time\_taken:.10f} seconds")

Output:



1. Write a Program to Sort a given set of elements using insertion sort method and determine the time required to sort the elements

Code:

import time

def insertion\_sort(arr):

    n = len(arr)

    for i in range(1, n):

        key = arr[i]

        j = i - 1

        while j >= 0 and arr[j] > key:

            arr[j + 1] = arr[j]

            j -= 1

        arr[j + 1] = key

arr = [10, 7, 8, 9, 1, 5, 12, 3, 2, 6]

n = len(arr)

start\_time = time.time()

insertion\_sort(arr)

end\_time = time.time()

time\_taken = (end\_time - start\_time)\*1000000

print("Sorted array:", arr)

print(f"Time taken to sort the elements: {time\_taken:.10f} seconds")

Output:

