

**Department of Computer Science**

**CSE2007: Design and Analysis of Algorithm**

**4th Semester 2021-22**

# PRESIDENCY UNIVERISTY, BENGALURU

**School of Engineering**

# PROGRAMME – B.Tech Computer Science and Engineering

**IV Semester 2021-22**

# DESIGN AND ANALYSIS OF ALGORITHM LAB (CSE2007)

## Session 1

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| **Non recursive algorithms** |
| 1. Implement Factorial of a number 2. finding max element 3. linear search 4. find their time and space efficiency. |
| **Algorithm** |
| **ALGORITHM** Factorial of a number *(n)*  Step 1: Start  Step 2: Declare variables n, factorial and i.  Step 3: Initialize variables factorial←1  i←1  Step 4: Read value of n  Step 5: Repeat the steps until i=n 5.1: factorial←factorial\*i  5.2: i←i+1  Step 6: Display factorial Step 7: Stop  **ALGORITHM** finding max element SET Max to array[0]  FOR i = 1 to array length - 1 IF array[i] > Max THEN SET Max to array[i] ENDIF  ENDFOR PRINT Max  **ALGORITHM** linear search/sequential search FOR i = 0 to array length - 1  IF X = array[i] THEN RETURN i  ENDIF ENDFOR RETURN -1 |

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| **Coding using C Language** |
| a. Implement Factorial of a number.  #include <stdio.h> int main()  {  int n, i;  unsigned long long factorial = 1; printf("Enter an integer: "); scanf("%d",&n);  // show error if the user enters a negative integer if (n < 0)  printf("Error! Factorial of a negative number doesn't exist.");  else  {  for(i=1; i<=n; ++i)  {  factorial \*= i; // factorial = factorial\*i;  }  printf("Factorial of %d = %llu", n, factorial);  }  return 0;  } |
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| b. Finding max element #include <stdio.h>  void main()  {  int i, n,max;  int arr[100];  printf("Enter total number of elements(1 to 100): "); scanf("%d", &n);  for(i = 0; i < n; ++i)  {  printf("Enter array of elements\n”);  scanf("%d", &arr[i]);  }  max=arr[0];  for(i = 1; i < =n; ++i)  {  if(arr[i]>max)  max= arr[i];  }  printf("Largest element = %d",max);  }  **Sample Input and Output:** |

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| c. linear search/sequential search  #include<stdio.h>  void main()  {  int a[100], key, i, n;  printf("Enter the number of elements in array\n"); scanf("%d", &n);  printf("Enter numbers\n");  for ( i= 0 ; i < n ; i++ )  {  scanf("%d",&a[i]);  }  printf("Enter the number to search\n"); scanf("%d", &key);  for ( i= 0 ; i < n ; i++ )  {  if ( a[i] == key) /\* if required element found \*/  {  printf("%d is present at location %d\n", key, i+1); break;  }  }  if ( i == n )  printf("%d is not present in array\n", key);  } |