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PROGRAMMING IN C

LAB FILE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (2024-2025)

FACULTY INCHARGE

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S.No	Program Title	Date	Signature
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PROGRAM 1

C Program to Print "Hello, World!"

```
#include <stdio.h>

int main() {
    printf("Hello, World!\n");
    return 0;
}
```

OUTPUT:

```
Hello, World!
```

PROGRAM 2

C Program to Perform Arithmetic Operations

```
#include <stdio.h>

int main() {
    int a = 10, b = 4, res;
    res = a + b;
    printf("a + b is %d\n", res);
    res = a - b;
    printf("a - b is %d\n", res);
    res = a * b;
    printf("a * b is %d\n", res);
    res = a / b;
    printf("a / b is %d\n", res);
    res = a % b;
    printf("a %% b is %d\n", res);
    return 0;
}
```

OUTPUT:

```
a + b is 14
a - b is 6
a * b is 40
a / b is 2
a % b is 2
```

PROGRAM 3

C Program to Find Sum and Average of Two Numbers

```
#include <stdio.h>

int main() {
   float avg, a, b;

   printf("Enter the numbers: ");
   scanf("%f%f", &a, &b);

   avg = (a + b) / 2;

   printf("\nAverage of %.2f and %.2f is = %.2f", a, b, avg);

   return 0;
}
```

OUTPUT:

```
Enter the numbers: 12 10

Average of 12.00 and 10.00 is = 11.00
```

PROGRAM 4

C Program to Find the Maximum of Two Numbers

```
#include <stdio.h>

int main() {
   int num1, num2;

   printf("Enter two numbers: ");
   scanf("%d%d", &num1, &num2);

   if (num1 > num2) {
      printf("%d is maximum", num1);
   }

   if (num2 > num1) {
      printf("%d is maximum", num2);
   }

   if (num1 == num2) {
      printf("Both are equal");
   }

   return 0;
}
```

OUTPUT:

```
Enter two numbers: 16 45
45 is maximum
```

PROGRAM 5

C Program to Calculate Gross Salary

```
#include<stdio.h>

int main() {
   int salary, hra, da, gross_salary;
   printf(" enter the salary : ");
   scanf("%d", &salary);

   printf(" enter hra :");
   scanf("%d", &hra);

   printf(" enter da :");
   scanf("%d", &da);

   gross_salary = salary + hra + da;
   printf(" Total salary is =%d", gross_salary);

   return 0;

}
```

OUTPUT:

```
enter the salary : 20000
enter hra :15000
enter da :10000
Total salary is =45000
```

PROGRAM 6

C Program to Check Leap Year

```
#include <stdio.h>

int main() {
    int year;
    printf("Enter a year: ");
    scanf("%d", &year);

    if (year % 400 == 0) {
        printf("%d is a leap year.", year);
    }

    else if (year % 100 == 0) {
        printf("%d is not a leap year.", year);
    }

    else if (year % 4 == 0) {
        printf("%d is a leap year.", year);
    }

    else {
        printf("%d is not a leap year.", year);
    }

    return 0;
}
```

OUTPUT:

```
Enter a year: 2020
2020 is a leap year.
```

PROGRAM 7

C Program to Print Even Numbers Using For Loop

```
#include <stdio.h>

int main() {
   int i, num;

   printf("Enter the Maximum Value: ");
   scanf("%d", &num);

   for (i = 1; i <= num; i++) {
      if (i % 2 == 0) {
         printf("%d \n", i);
      }
   }
   return 0;
}
```

OUTPUT:

```
Enter the Maximum Value: 20
2
4
6
8
10
12
14
16
18
20
```

PROGRAM 8

C Program to Print Odd Numbers Using For Loop

```
#include<stdio.h>

int main() {
   int i, number;

   printf("\n Please Enter the Maximum Limit Value :  ");
   scanf("%d", &number);

   printf("\n Odd Numbers between 1 and %d are : \n", number);
   for (i = 1; i <= number; i++) {
      if (i % 2 != 0) {
         printf(" %d\t", i);
      }
   }

   return 0;
}
```

OUTPUT:

```
Please Enter the Maximum Limit Value :  20

Odd Numbers between 1 and 20 are :
1      3      5      7      9      11      13      15      17      19
```

PROGRAM 9

C Program to Generate Multiplication Table

```
#include <stdio.h>

int main() {
   int num;
   printf("Enter an integer: ");
   scanf("%d", &num);

   for (int i = 1; i <= 10; ++i) {
      printf("%d * %d = %d \n", num, i, num * i);
   }
   return 0;
}
```

OUTPUT:

```
Enter an integer: 6
6 * 1 = 6
6 * 2 = 12
6 * 3 = 18
6 * 4 = 24
6 * 5 = 30
6 * 6 = 36
6 * 7 = 42
6 * 8 = 48
6 * 9 = 54
6 * 10 = 60
```

PROGRAM 10

C Program to Print a Different Pattern

```
#include <stdio.h>

int main() {
    int rows = 5;

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

        for (int j = 0; j < 2 * i; j++) {
            printf(" ");
        }

        for (int k = 0; k < 2 * (rows - i) - 1; k++) {
            printf("* ");
        }
        printf("\n");
    }
    return 0;
}
```

OUTPUT:

```
* * * * * * * * *
 * * * * * * *
  * * * * *
   * * *
    *
```

PROGRAM 11

C Program to Calculate Sum of all Elements of an Array

```
#include<stdio.h>

int main() {
   int Size, i, a[^10];
   int num = 0;

   printf("\n Please Enter the Size\n");
   scanf("%d", &Size);

   printf("\nPlease Enter the Elements\n");
   for (i = 0; i < Size; i++) {
      scanf("%d", &a[i]);
   }
   for (i = 0; i < Size; i++) {
      num = num + a[i];
   }

   printf("Sum = %d ", num);
   return 0;
}
```

OUTPUT:

```
Please Enter the Size
4

Please Enter the Elements
12
6
2
8
Sum = 28
```

PROGRAM 12

C Program to Implement Linear Search

```
#include <stdio.h>

int main() {
   int a[^10], i, item, n;
   printf("\nEnter number of elements of an array:\n");
   scanf("%d", &n);
   printf("\nEnter elements: \n");
   for (i = 0; i < n; i++)
      scanf("%d", &a[i]);
   printf("\nEnter item to search: ");
   scanf("%d", &item);
   for (i = 0; i <= 9; i++)
      if (item == a[i]) {
         printf("\nItem found at location %d", i + 1);
         break;
      }
   if (i > 9)
      printf("\nItem does not exist.");
   return 0;
}
```

OUTPUT:

```
Enter number of elements of an array:
10

Enter elements:
12
11
20
44
45
163
41
412
1
2
Enter item to search: 44

Item found at location 4
```

PROGRAM 13

C Program to Implement Binary Search

```
#include <stdio.h>

int main() {
   int i, first, last, mid, n, search, array[^100];

   printf("Enter number of elements\n");
   scanf("%d", &n);
   printf("Enter %d integers\n", n);
   for (i = 0; i < n; i++)
      scanf("%d", &array[i]);
   printf("Enter value to find\n");
   scanf("%d", &search);

   first = 0;
   last = n - 1;
   mid = (first + last) / 2;

   while (first <= last) {
      if (array[mid] < search)
         first = mid + 1;
      else if (array[mid] == search) {
         printf("%d found at location %d.\n", search, mid + 1);
         break;
      }
      else
         last = mid - 1;
      mid = (first + last) / 2;
   }
   if (first > last)
      printf("Not found! %d isn't present in the list.\n", search);
   return 0;
}
```

OUTPUT:

```
Enter number of elements
3
Enter 3 integers
12
3
4
```

```
Enter value to find
4
4 found at location 3.
```

PROGRAM 14

C Program to Add Two Matrices

```
#include <stdio.h>

int main() {
   int a[^10][^10], b[^10][^10], sum[^10][^10], i, j, column, row;

   printf("Enter total no. of rows[Between 1 and 10]: ");
   scanf("%d", &row);
   printf("Enter total no. of columns[Between 1 and 10]: ");
   scanf("%d", &column);

   printf("Enter First Matrix: \n");
   for (i = 0; i < row; i++)
      for (j = 0; j < column; j++)
         scanf("%d", &a[i][j]);

   printf("Enter Second Matrix: \n");
   for (i = 0; i < row; i++)
      for (j = 0; j < column; j++)
         scanf("%d", &b[i][j]);

   for (i = 0; i < row; i++) {
      for (j = 0; j < column; j++) {
         sum[i][j] = a[i][j] + b[i][j];
      }
   }

   // Printing the result
   printf("Sum of Two Matrices: \n");
   for (i = 0; i < row; i++) {
      for (j = 0; j < column; j++)

      {
         printf("%d ", sum[i][j]);
      }
```

```
        printf("\n");
    }
    return 0;
}
```

OUTPUT:

```
Enter total no. of rows[Between 1 and 10]: 2
Enter total no. of columns[Between 1 and 10]: 2
Enter First Matrix:
12
10
8
9
Enter Second Matrix:
4
9
18
2
Sum of Two Matrices:
16 19
26 11
```

PROGRAM 15

C Program to Transpose a Given Matrix

```
#include <stdio.h>

int main() {
   int a[^10][^10], transpose[^10][^10], r, c;
   printf("Enter rows and columns: ");
   scanf("%d %d", &r, &c);

   printf("\nEnter matrix elements:\n");
   for (int i = 0; i < r; ++i)
      for (int j = 0; j < c; ++j) {
         printf("Enter element a%d%d: ", i + 1, j + 1);
         scanf("%d", &a[i][j]);
      }
   printf("\nEntered matrix: \n");
   for (int i = 0; i < r; ++i)
      for (int j = 0; j < c; ++j) {
         printf("%d  ", a[i][j]);
         if (j == c - 1)
            printf("\n");
      }

   for (int i = 0; i < r; ++i)
      for (int j = 0; j < c; ++j)
      {
         transpose[j][i] = a[i][j];
      }

   printf("\nTranspose of the matrix:\n");
   for (int i = 0; i < c; ++i)
      for (int j = 0; j < r; ++j) {
         printf("%d  ", transpose[i][j]);
         if (j == r - 1)
            printf("\n");
      }
   return 0;
}
```

OUTPUT:

```
Enter rows and columns: 2 2

Enter matrix elements:
Enter element a11: 12
Enter element a12: 54
Enter element a21: 16
Enter element a22: 13

Entered matrix:
12  54
16  13

Transpose of the matrix:
12  16
54  13
```

PROGRAM 16

C Program to Implement Binary Search

```
#include <stdio.h>
int main() {
  int c, first, last, middle, n, search, array[^100];
  printf("Enter number of elements\n");
  scanf("%d", &n);
  printf("Enter %d integers\n", n);
  for (c = 0; c < n; c++)
    scanf("%d", &array[c]);
  printf("Enter value to find\n");
  scanf("%d", &search);
  first = 0;
  last = n - 1;
  middle = (first+last)/2;
  while (first <= last) {
    if (array[middle] < search)
      first = middle + 1;
    else if (array[middle] == search) {
      printf("%d found at location %d.\n", search, middle+1);
      break;
    }
    else
      last = middle - 1;
      middle = (first + last)/2;
  }
  if (first > last)
    printf("Not found! %d isn't present in the list.\n", search);
  return 0;
}
```

OUTPUT:

```
Enter number of elements
4
Enter 3 integers
12
8
6
Enter value to find
8
8 found at location 2.
```