| **Semester** | **Course Code** | **Course Title** |
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| Autumn 2024-25 | IT161 | Computer Programming and Problem Solving |

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| As.No. | 7 |
| Assessment Title. | Operators and Selection Statements |
| Date of Submission | 24-Oct-2024 |

| **Format/Frame Work** | |
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| **Question** | Professor will give it. |
| **Flowchart** | Image from your notebook |
| **Program** | Should be typed content,  It may be program, syntax, or theory.  Screen Shorts are not acceptable.  **Note:** Student name should be specified in given content (i.e., Include your Roll-number and name in comment) |
| **Output:** | Probably Typed or copy-past content of your program output. If it is difficult, then put output-screen shorts.  NOTE: Include your name in the comment. |
| **Your Observation** |  |

Assignment Programs on Operators

1. Write a program of your choice that illustrates the concept of operators.
2. Program to shift input data two bits to the left.
3. Write a C program to swap two numbers using bitwise operators.
4. Write a C program to find the size of data types using miscellaneous operators.

Assignments Programs on Selection Statements

1. C program to check whether a number is positive, negative, or zero.
2. Write a program to find the roots of a quadratic equation using if and switch.
3. Write a program to find the largest of three numbers using the ternary operator.
4. C program to check whether a character is a vowel or consonant.
5. C program to check whether a character is an alphabet or not.
6. C program to enter a week number and print the corresponding day of the week.
7. C program to check whether a given number is EVEN or ODD using the ternary operator.
8. Write a program to check whether a given number is even or odd, and also determine its sign (positive or negative) using conditional statements like if and switch.
9. Write a C program to read marks for a minimum of 6 subjects, calculate the total marks and average, and assign a grade based on the average using the following criteria: 90 and above: Grade A, 75 to 89: Grade B, 60 to 74: Grade C, 45 to 59: Grade D, 35 to 44: Just pass (Grade P), below 35: Grade F. Use the switch statement to implement the grade assignment.

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| **Question 1** | Write a program using loops to read and display array data. |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name:Rajveer Chaudhari\nRoll No: 202411024\n");    int ar[10];    for(int i=0;i<5;i++){  printf("Enter The number\n");  scanf("%d",&ar[i]);  }    for(int i=0;i<5;i++){  printf("%d\n",ar[i]);  }  } |
| **Output:** |  |
| **Your Observation** | array\_name[i] → here ‘i’ is used to define how many number of elements array will store  if i=10 it will store 9 elements |

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| **Question 2** | Write a Program to find the sum of elements in array. |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){    printf("Name:Rajveer Chaudhari\nRoll No:202411024\n");  int arr[5];  int b=0;    for(int i=0;i<5;i++){  printf("Enter Number\n");  scanf("%d",&arr[i]);  }    for(int i=0;i<5;i++){  b = b + arr[i];  }    printf("Sum: %d\n",b);  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 3** | Write a program to find largest number in array |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name:Rajveer Chaudhari\nRoll No: 202411024\n");  int arr[5],c;    for(int i=0; i<5;i++){  printf("Enter Number\n");  scanf("%d",&arr[i]);  }    c = arr[0];    for(int i=0;i<5;i++){    if(arr[i] > c){  c = arr[i];  }  }  printf("largest Number is:%d\n",c);  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 4** | Write a program to remove duplicate elements from an array |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){    printf("Name:Rajveer Chaudhari\nRoll No:202411024");    int arr[5],b;    for(int i=0; i<5;i++){  printf("Enter Number\n");  scanf("%d",&arr[i]);  }    for(int i=0;i<5;i++){    if(arr[i] != 0){    b = arr[i];    for(int j=0;j<5;j++){    if(i != j){  if(arr[j] == b){    arr[j]=0;  printf("%d and %d Number were same\nDeleting Number %d\n",i+1,j+1,j+1);  }  }  }  }  }    for(int i=0;i<5;i++){  printf("%d\n",arr[i]);  }  } |
| **Output:** |  |
| **Your Observation** | Default value of an element of array in 0. |

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| **Question 5** | Write a program to read and print a string using a character array |
| **Flow chart** |  |
| **Program or Related Content** | #include <stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No: 202411024\n");  char arr[1000];  printf("Enter the string that you want to print\n");  fgets(arr,sizeof(arr),stdin);  printf("%s",arr);  } |
| **Output:** |  |
| **Your Observation** | scanf() : This function will not read whole string if it has spaces  fgets(): Best for taking string as input |

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| **Question 6** | write a program to read a string and count occurrences of vowels, consonants, words, spaces, and special characters in the given string. |
| **Flow chart** |  |
| **Program or Related Content** | #include <stdio.h>  #include <string.h>  #include <ctype.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int vowel=0,words=0,cons=0,spaces=0,sc=0;  char arr[1000];  char v\_owel[5]= {'a','e','i','o','u'};  char c\_onsonat[21]={'b','c','d','f','g','h','j','k','l','m','n','p','q','r','s','t','v','w','x','y','z'};  char s\_c[10] = {'!','#','$','%','&','^','\*','@','~','?'};  printf("Enter the string\n");  fgets(arr,sizeof(arr),stdin);  int len = strlen(arr) - 1;  //to lowercase all  for(int i=0;i<len;i++){  char temp = arr[i];  arr[i] = tolower(temp);  }  for(int i=0;i<len;i++){  //Vowel counting  for(int j=0; j<5;j++){  if(arr[i]==v\_owel[j]){  vowel++;  }  }  //Consonant  for(int j=0; j<21;j++){  if(arr[i]==c\_onsonat[j]){  cons++;  }  }  //Spaces  if(arr[i]==' '){  spaces++;  }  //words  if(arr[i]==' '){  if(arr[i+1] != ' '){  words++;  }  }  //Special Charachter  for(int j=0; j<10;j++){  if(arr[i]==s\_c[j]){  sc++;  }  }  }  words++; //cuz also gotta count first word  printf("Vowels=%d\nConsonants=%d\nSpaces=%d\nWords=%d\nSpecial Char=%d",vowel,cons,spaces,words,sc);  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 7** | Write a program to check if a string is a palindrome. |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  char c[5], a;  int i=0;  printf("Enter any 5 letter word: ");  while((a = getchar()) != '\n' && i<5 ){  c[i] = a;  i++;  }  if((c[0] == c[4]) && (c[1] == c[3])){  printf("This word is palindrome\n");  }  else{  printf("This word is not palindrome\n");  }  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 8** | Write C program to read and display matrices |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int a[2][3];  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  printf("Enter the value of a[%d][%d]\n",i,j);  scanf("%d",&a[i][j]);  }  printf("\n");  }  printf("Matrics is\n");  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  printf("%d ",a[i][j]);  }  printf("\n");  }  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 9** | Write C program to read matrices and perform their addition |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int a[2][3];  int b[2][3];  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  printf("Enter the value of a[%d][%d]\n",i,j);  scanf("%d",&a[i][j]);  }  printf("\n");  }  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  printf("Enter the value of b[%d][%d]\n",i,j);  scanf("%d",&b[i][j]);  }  printf("\n");  }  printf("Sum of matrics is\n");  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  printf("%d ", a[i][j] + b[i][j]);  }  printf("\n");  }  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 10** | Multiply two matrices |
| **Flow chart** |  |
| **Program or Related Content** | #include <stdio.h>  void main()  {  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int x, y, z, w, h = 0;  char p;  back:  printf("Enter the value of m in m x n: ");  scanf("%d", &x);  printf("Enter the value of n in m x n: ");  scanf("%d", &y);  printf("Enter the value of q in q x r: ");  scanf("%d", &w);  printf("Enter the value of r in q x r: ");  scanf("%d", &z);  printf("\n");  int a[x][y];  int b[w][z];  if (y == w)  {  for (int i = 0; i < x; i++)  {  for (int j = 0; j < y; j++)  {  printf("Enter the value of a[%d][%d]\n", i, j);  scanf("%d", &a[i][j]);  }  printf("\n");  }  for (int i = 0; i < w; i++)  {  for (int j = 0; j < z; j++)  {  printf("Enter the value of b[%d][%d]\n", i, j);  scanf("%d", &b[i][j]);  }  printf("\n");  }  printf("Multiplication of matrices is\n");  for (int i = 0; i < x; i++)  {  for (int j = 0; j < z; j++)  {  h = 0;  for (int v = 0; v < w; v++)  {  h = h + a[i][v] \* b[v][j];  }  printf("%d ", h);  }  printf("\n");  }  }  else  {  printf("This matrix cannot be multiply because of the n and q are not equal please try again\n\n");  goto back;  }  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 11** | Find transpose of a matrix |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int a[3][3];  for(int i=0; i<3;i++){  for(int j=0; j<3; j++){  printf("Enter the value of a[%d][%d]\n",i,j);  scanf("%d",&a[i][j]);  }  printf("\n");  }  printf("Matrics is\n");  for(int i=0; i<3;i++){  for(int j=0; j<3; j++){  printf("%d ",a[i][j]);  }  printf("\n");  }  printf("After transpose Matrics is\n");  for(int i=0; i<3;i++){  for(int j=0; j<3; j++){  printf("%d ",a[j][i]);  }  printf("\n");  }  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 12** | Using 3D arrays and perform the addition of two 3D arrays |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int a[2][3][2];  int b[2][3][2];  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  for(int k=0; k<2; k++){  printf("Enter the value of a[%d][%d][%d]\n",i,j,k);  scanf("%d",&a[i][j][k]);  }  printf("\n");  }  printf("\n");  }  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  for(int k=0; k<2; k++){  printf("Enter the value of b[%d][%d][%d]\n",i,j,k);  scanf("%d",&b[i][j][k]);  }  printf("\n");  }  printf("\n");  }  printf("3D matrics is a \n");  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  for(int k=0; k<2; k++){  printf("%d ", a[i][j][k]);  }  printf("\n");  }  printf("\n");  }  printf("3D matrics is b \n");  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  for(int k=0; k<2; k++){  printf("%d ", b[i][j][k]);  }  printf("\n");  }  printf("\n");  }  printf("And sum of two matrics is\n");  for(int i=0; i<2;i++){  for(int j=0; j<3; j++){  for(int k=0; k<2; k++){  printf("%d ", a[i][j][k] + b[i][j][k]);  }  printf("\n");  }  printf("\n");  }  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 13** | add two numbers using pointers |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int a, b;  printf("Enter the value of a: ");  scanf("%d", &a);  printf("Enter the value of b: ");  scanf("%d", &b);  int \*p = &a;  int \*q = &b;  int sum = \*p+\*q;  printf("Sum is %d\n",sum);  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 14** | Write program that uses pointers with arrays to read display array elements |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int a[5];  for(int i=0; i<5; i++){  printf("Enter the value of a[%d]: ", i);  scanf("%d",&a[i]);  }  int \*p = a;  for(int k=0 ; k<5 ; k++){  printf("The value of a[%d] is %d\n",k,\*p);  p++;  }  printf("\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 15** | Perform pointer arithmetic and access array elements |
| **Flow chart** |  |
| **Program or Related Content** | #include<stdio.h>  void main(){  printf("Name: Rajveer Chaudhari\nRoll No:202411024\n");  int a[5];  for(int i=0; i<5; i++){  printf("Enter the value of a[%d]: ", i);  scanf("%d",(a+i));  }  printf("\n");  printf("The array a is\n");  for(int j=0; j<5; j++){  printf("%d ", \*(a + j));  }  printf("\n");  printf("\n");  } |
| **Output:** |  |
| **Your Observation** |  |