|  | **Semester** | | **Course Code** | | **Course Title** |
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|  |  | |  | | Computer Programming and Problem Solving |
|  | Autumn 2024-25 | | IT161 | |  |
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| As.No. | | | | 8 | | | |
| Assessment Title. | | | | Programs on Files, Structures and Union, typedef and Enumeration. | | | |
| Date of Submission | | | | 25-November-2024 | | | |
|  | | **Format/Frame Work** | | | | |
| **Question** | | Professor will give it. | | | | |
| **Flowchart** | | Image from your notebook (optional) | | | | |
| **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 Rollnumber 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** | |  | | | | |

**Files structures:**

* **Write a C program to demonstrate file handling operations (create/open, write, read, and close).**
* **Write a C program to read a file's content and display it on the screen.**
* **Write a C program to append content to an existing file.**
* **Write a C program to count the number of characters, words, lines, spaces, digits, alphabets, and other characters in a given file.**
* **Write a C program to copy the contents of one file to another.**
* **Write a C program to merge the contents of two files into a third file.**
* **Write a C program to search for a specific word in a file and replace it with another word.**
* **Program to read characters from a text file and print number of vowels, consonants and other characters in the file. Assume that the file will consist of mostly English-language letters.**

**Structures and Union:**

* **Employee Structure: Define a structure for storing employee information, including employee ID, name, department, and salary. Write a program to take input for 5 employees and display their information.**
* **Student Grades: Create a union to store a student's roll number, name, and marks in three subjects. Write a program to calculate and display the total marks and average for each student.**
* **Write a program to create a nested structure where a "Book" structure contains information about the book title, author, and price, and an "Author" structure contains the author's name and birth year. Display the information for multiple books and their authors.**
* **Also try union is a member of structure and structure is a member of union with any program.**

**Typedef:**

* **Use typedef to define new data types for unsigned int as uint and float as decimal. Write a program that uses these new types to perform arithmetic operations.**
* **Program to use of type def for the pointer variables' point of view with examples.**
* **Typedef with Arrays: Use typedef to define an alias for an array of 5 integers as IntArray. Write a program that uses this type to store and display integer values.**

**Enumeration:**

* **Create an enumerated data type for the 12 months. Write a program to display each month’s name along with its integer value.**
* **Define an enum for the days of the week. Write a program to take a day’s integer value (e.g., 1 for Sunday, 2 for Monday) from the user and display the corresponding day’s name.**
* **Create an enum to represent traffic light signals (e.g., RED, YELLOW, GREEN). Write a program that simulates the behavior of a traffic light by displaying the current light and asking the user if they want to proceed or stop.**
* **Define an enumeration for the four seasons (Winter, Spring, Summer, Fall). Write a program to take an integer input and display the corresponding season**

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| **Question 1** | **Write a C program to demonstrate file handling operations (create/open, write, read, and close).** |
| **Flow chart** |  |
| **Program or Related Content** | #include <stdio.h>  #include <stdlib.h>  int main() {  FILE \*ptr;  char str[50], ing[50] = "HI I am Rajveer Chaudhari";  // \*\*\*\*\* Reading a file \*\*\*\*\*  ptr = fopen("myfile.txt", "r");  if (ptr == NULL) {  printf("Error: Could not open file.\n");  return 1;  }  int i = 0;  char ch;  while ((ch = fgetc(ptr)) != EOF ) {  str[i] = ch;  i++;  }  str[i] = '\0';  fclose(ptr);  printf("%s\n", str);  // puts(str);  // \*\*\*\*\* Writing a file \*\*\*\*\*  ptr = fopen("myfile.txt", "w");  fprintf(ptr, "%s", ing);  printf("%s",ing);  // \*\*\*\*\* Appending a file \*\*\*\*\*  ptr = fopen("myfile.txt", "a");  fprintf(ptr, "%s", ing);  printf("\nName: Rajveer Chaudhari \n");  printf("\nRoll Number: 202411024\n");  return 0;  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 2** | Write a C program to read a file's content and display it on the screen. |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Write a C program to read a file's content and display it on the screen.  \*/  #include<stdio.h>  #include<string.h>  void main(){  FILE \*ptr= fopen("myfile.txt","r");  if(ptr == NULL){  printf("Error opening file\n");  }  char str[50];  fgets(str, 50, ptr);  printf("%s",str);  fclose(ptr);  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 3** | Write a C program to append content to an existing file |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Write a C program to append content to an existing file.  \*/  #include<stdio.h>  void main(){  FILE \*ptr;  ptr = fopen("myfile.txt","a");  if(ptr == NULL){  printf("Error opening file\n");  }  char str[50] = "Hello World\n";  fputs(str, ptr);  printf("%s",str);  fclose(ptr);  printf("Name: Rajveer Chaudhari \n");  printf("\nRoll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |
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| **Question 4** | Write a C program to count the number of characters, words, lines, spaces, digits, alphabets, and other characters in a given file |
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| **Flow chart** |  |
| **Program or Related Content** | /\*  Write a C program to count the number of characters, words, lines, spaces, digits, alphabets, and other characters in a given file  \*/  #include<stdio.h>  #include<string.h>  #include<ctype.h>  void main(){  FILE \*ptr = fopen("myfile.txt", "r");  char ch,str[100];  int i = 0;  while((ch = fgetc(ptr)) != EOF){  str[i] = ch;  i++;  }  str[i] = '\0';  int cnt = 0,x = 0,y = 0,z = 0,w = 0;  for(int k = 0; k<i; k++){  if(isalpha(str[k])){cnt++;}  else if(isdigit(str[k])){x++;}  else if((int)str[k] == 32){y++;}  else if(ispunct(str[k])){z++;}  else if(str[k] == '\n'){w++;};  }  printf("\nWord: %s",str);  printf("\ncharacters: %d\n",i);  printf("Alphabet: %d\n",cnt);  printf("Digit: %d\n",x);  printf("Space: %d\n",y);  printf("special Character: %d\n",z);  printf("Lines: %d\n",w+1);  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 5** | Write a C program to copy the contents of one file to another |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Write a C program to copy the contents of one file to another.  \*/  #include<stdio.h>  void main(){  FILE \*ptr1 = fopen("myfile.txt", "r");  FILE \*ptr2 = fopen("myfile2.txt","w");  if(ptr1 == NULL || ptr2 == NULL){  printf("Error opening file\n");  }  char ch,str[50];  int i=0;  while((ch = fgetc(ptr1)) != EOF){  str[i] = ch;  i++;  }  str[i] = '\0';  fputs(str,ptr2);  printf("\*\*%s\*\* is copied to another file\n",str);  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 6** | Write a C program to merge the contents of two files into a third file |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Write a C program to merge the contents of two files into a third file  \*/  #include<stdio.h>  #include<string.h>  void main(){  FILE \*ptr1 = fopen("myfile.txt", "r");  FILE \*ptr2 = fopen("myfile2.txt","r");  FILE \*ptr3 = fopen("myfile3.txt","w");  if(ptr1 == NULL || ptr2 == NULL || ptr3 == NULL){  printf("Error opening file\n");  }  char ch,str[100];  int i=0;  while((ch = fgetc(ptr1)) != EOF){  str[i] = ch;  i++;  }  while((ch = fgetc(ptr2)) != EOF){  str[i] = ch;  i++;  }  str[i] = '\0';  fputs(str,ptr3);  fclose(ptr1);  fclose(ptr2);  fclose(ptr3);  printf("\*\*%s\*\* \nis the merge of two files into 3rd file\n",str);  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 7** | Write a C program to search for a specific word in a file and replace it with another word |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Write a C program to search for a specific word in a file and replace it with another word.  \*/  #include<stdio.h>  #include <string.h>  void search(const char \*oldword, const char \*newword)  {  char line[300], newline[100];  int count = 0, i = 0;  int oldwordlenth = strlen(oldword);  int newwordlenth = strlen(newword);  FILE \*ptr = fopen("myfile.txt", "r");  FILE \*ptr2 = fopen("temp.txt", "w");  while (fgets(line, sizeof(line), ptr))  {  char \*ptrs;  while ((ptrs = strstr(&line[i], oldword)) != NULL)  {  fprintf(ptr2, "%.\*s", (int)(ptrs - line), line);  fprintf(ptr2, "%s", newword);  strcpy(line, ptrs + oldwordlenth); ptrs = line;  }  fprintf(ptr2, "%s", line);  }  fclose(ptr);  fclose(ptr2);  remove("myfile.txt");  rename("temp.txt", "myfile.txt");  printf("\nstring removed successfully");  }  int main()  {  char oldword[100], newword[100];  printf("enter the word which you want to replace:\n");  scanf("%[^\n]", oldword);  printf("enter the word which you want to replace with:\n");  getchar();  scanf("%[^\n]", newword);  search(oldword, newword);  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 8** | Program to read characters from a text file and print number of vowels, consonants and other characters in the file. Assume that the file will consist of mostly English-language letters |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Program to read characters from a text file and print number of vowels, consonants and other characters in the file. Assume that the file will consist of mostly English-language letters.  \*/  #include<stdio.h>  #include<string.h>  #include<ctype.h>  void main(){  FILE \*ptr = fopen("myfile.txt", "r");  char ch,str[100];  int i = 0;  while((ch = fgetc(ptr)) != EOF){  str[i] = ch;  i++;  }  str[i] = '\0';  int cnt = 0,x = 0,y = 0,z = 0,w = 0;  for(int k = 0; k<i; k++){  if(isalpha(str[k])){  if(str[k] == 'a' || str[k] == 'e'|| str[k] == 'i'|| str[k] == 'o'|| str[k] == 'u'|| str[k] == 'A'|| str[k] == 'E'|| str[k] == 'I'|| str[k] == 'O'|| str[k] == 'U'){cnt++;}  else{x++;}  }  else if(ispunct(str[k])){z++;}  }  printf("\nWord: \n%s",str);  printf("\nVowel: %d\n",cnt);  printf("Consonant: %d\n",x);  printf("special Character: %d\n",z);  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 9** | Employee Structure: Define a structure for storing employee information, including employee ID, name, department, and salary. Write a program to take input for 5 employees and display their information |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Employee Structure: Define a structure for storing employee information, including employee ID, name, department, and salary. Write a program to take input for 5 employees and display their information.  \*/  #include <stdio.h>  struct employee  {  int id;  char name[50];  char department[100];  float salary;  };  void main()  {  int c;  printf("Enter the number of employee: ");  scanf("%d",&c);  struct employee s[c];  for (int i = 0; i < c; i++)  {  printf("Enter the id of the employee: ");  scanf("%d",&s[i].id);  printf("Enter the name: ");  getchar();  scanf("%s", &s[i].name);  printf("Enter the department: ");  getchar();  scanf("%s", &s[i].department);  printf("Enter the salary: ");  scanf("%f", &s[i].salary);  printf("\n\n");  }  for (int i = 0; i < c; i++)  {  printf("ID is %d\n", s[i].id);  printf("Name of employee is %s\n", s[i].name);  printf("Department of employee is %s\n", s[i].department);  printf("Salary is %.2f\n", s[i].salary);  printf("\n");  }  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 10** | Student Grades: Create a union to store a student's roll number, name, and marks in three subjects. Write a program to calculate and display the total marks and average for each student |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Student Grades: Create a union to store a student's roll number, name, and marks in three subjects. Write a program to calculate and display the total marks and average for each student.  \*/  #include <stdio.h>  union student  {  char name[50];  int rol;  float mark[3];  float avg;  };  void main()  {  int c,t=0;  printf("Enter the number of student: ");  scanf("%d",&c);    union student s[c];  for (int i = 0; i < c; i++)  {  t = 0;  printf("Enter the name: ");  // gets(s1.c[i][50]);  scanf("%s", &s[i].name);  printf("Enter the roll number: ");  scanf("%d", &s[i].rol);  for(int j =0; j<3; j++){  printf("Enter the marks subject %d: ",j+1);  scanf("%f", &s[i].mark[j]);  t = t + s[i].mark[j];  }  s[i].avg = t/3;  printf("\n");  }  for (int i = 0; i < c; i++)  {  printf("Name is %s\n", s[i].name);  printf("Roll Number is %d\n", s[i].rol);  printf("Percentage is %.2f\n", s[i].avg);  printf("\n");  }  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 11** | Write a program to create a nested structure where a "Book" structure contains information about the book title, author, and price, and an "Author" structure contains the author's name and birth year. Display the information for multiple books and their authors. |
| **Flow chart** |  |
| **Program or Related Content** | /\*  \*/  #include <stdio.h>  #include <string.h>  #include <stdlib.h>  typedef struct book  {  char title[50];  char writer[50];  float price;  struct author  {  char auth\_name[50];  int yob;  } x, y, z;  } book;  int main()  {    book b1;  strcpy(b1.title, "Hobbit");  strcpy(b1.writer, "J. R. R. Tolkien");  b1.price = 450;  strcpy(b1.x.auth\_name, "J. R. R. Tolkien");  b1.x.yob = 1920;  book b2;  strcpy(b2.title, "Harry Potter");  strcpy(b2.writer, "J. K. Rowling");  b2.price = 400;  strcpy(b2.y.auth\_name, "J. K. Rowling");  b2.y.yob = 1948;  book b3;  strcpy(b3.title, "A Game of Thrones");  strcpy(b3.writer, "George R. R. Martin");  b3.price = 1000;  strcpy(b3.z.auth\_name, "George R. R. Martin");  b3.z.yob = 1948;  printf("Book name: %s price: %.2f Author: %s\n", b1.title, b1.price, b1.x.auth\_name);  printf("Book name: %s price: %.2f Author: %s\n", b2.title, b2.price, b2.y.auth\_name);  printf("Book name: %s price: %.2f Auther: %s\n", b3.title, b3.price, b3.z.auth\_name);    printf("Name: Rajveer Chaudhari\nRoll No. 202411024\n\n");  return 0;  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 12** | Use typedef to define new data types for unsigned int as uint and float as decimal. Write a program that uses these new types to perform arithmetic operations |
| **Flow chart** |  |
| **Program or Related Content** | /\*  \*/  #include<stdio.h>  void main(){  typedef int uint;  typedef float decimal;  uint a,b;  decimal c,d;  printf("a, b: ");  scanf("%d %d",&a,&b);  printf("c, d: ");  scanf("%f %f",&c,&d);  printf("sum is %d\n",a+b);  printf("division is %.2f",c/d);  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 13** | Program to use of type def for the pointer variables' point of view with examples |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Program to use of type def for the pointer variables' point of view with examples.  \*/  #include<stdio.h>  void main(){  typedef int\* ptr;  int a,b;  ptr ptr1 = &a,ptr2=&b;  printf("a, b: ");  scanf("%d %d",ptr1,ptr2);  printf("sum is %d", \*ptr1 + \*ptr2);  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 14** | Typedef with Arrays: Use typedef to define an alias for an array of 5 integers as IntArray. Write a program that uses this type to store and display integer values |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Typedef with Arrays: Use typedef to define an alias for an array of 5 integers as IntArray. Write a program that uses this type to store and display integer values.  \*/  #include<stdio.h>  void main(){  typedef int intarray[5];  intarray arr;  for(int i = 0; i<5; i++){  printf("arr[%d]: ",i);  scanf("%d",&arr[i]);  }  for(int i =0; i<5; i++){  printf("%d ",arr[i]);  }  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 15** | Create an enumerated data type for the 12 months. Write a program to display each month’s name along with its integer value |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Create an enumerated data type for the 12 months. Write a program to display each month’s name along with its integer value.  \*/  #include<stdio.h>  enum months{january,february,march,april,may,june,july,augest,september,october,november,december};  void main(){  enum months first = january;  printf("Numeric value of first (Month): %d\n", first+1);  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 16** | Define an enum for the days of the week. Write a program to take a day’s integer value (e.g., 1 for Sunday, 2 for Monday) from the user and display the corresponding day’s name |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Define an enum for the days of the week. Write a program to take a day’s integer value (e.g., 1 for Sunday, 2 for Monday) from the user and display the corresponding day’s name.  \*/  #include <stdio.h>  enum Weekday { Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday };  int main() {  enum Weekday today = Monday;  printf("Numeric value of today (Monday): %d\n", today);  today = Friday;  printf("Numeric value of today (Friday): %d\n", today); // Output: 5  return 0;  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 17** | Create an enum to represent traffic light signals (e.g., RED, YELLOW, GREEN). Write a program that simulates the behavior of a traffic light by displaying the current light and asking the user if they want to proceed or stop |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Create an enum to represent traffic light signals (e.g., RED, YELLOW, GREEN). Write a program that simulates the behavior of a traffic light by displaying the current light and asking the user if they want to proceed or stop.  \*/  #include<stdio.h>  typedef enum {  RED,  YELLOW,  GREEN  } TrafficLight;  void main(){  TrafficLight signal = RED;  printf("Numeric value of RED: %d\n", signal);  if (signal == RED) {  printf("Stop\n");  } else if (signal == YELLOW) {  printf("Caution\n");  } else if (signal == GREEN) {  printf("Go\n");  }  printf("\nName: Rajveer Chaudhari \n");  printf("Roll Number: 202411024\n");  } |
| **Output:** |  |
| **Your Observation** |  |

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| **Question 18** | Define an enumeration for the four seasons (Winter, Spring, Summer, Fall). Write a program to take an integer input and display the corresponding season |
| **Flow chart** |  |
| **Program or Related Content** | /\*  Define an enumeration for the four seasons (Winter, Spring, Summer, Fall). Write a program to take an integer input and display the corresponding season  \*/  #include<stdio.h>  #include<string.h>  #include<stdlib.h>  enum season {win,sp,sum,fall};  int main(){  char ch[4][10] = {"Winter","Spring","Summer","Fall"};  int a;  printf("Enter required Season (Winter = 0, Spring = 1, Summer = 2, Fall = 3): ");  scanf("%d",&a);  enum season now = a;  printf("Requied Season: %s",ch[a]);  printf("\n");  return 0;  } |
| **Output:** |  |
| **Your Observation** |  |