KHWOPA COLLEGE OF ENGINEERING

FINAL ASSESSMENT - 2075 [ODD]

Level	BE	**Full Marks**	80
Programme	BCT/BEL	**Pass Marks**	32
Year/Part	I / I	**Time**	3 hrs.

SUBJECT:- Computer Programming

Attempt all questions.

1. a) Explain general software features & recent trends. Develop an algorithm for finding the sum of the series 1+2+3+... upto N terms.[2+3]

General Software Features & Recent Trends [4*0.5]:
Algorithm [3]:

b) What is debugging? What are main difference between *testing* and *debugging*? Distinguish between application software & system software.

Debugging [1]: [1+2+2]
Testing vs. Debugging [4*0.5]:
Application S/w vs. System S/w [4*0.5]:

2. a) "C is also known as middle level language", Justify the statement. What is source code? Why is compilation needed before executing a C program? [2+1+2]

C is also known as middle level language [2]:
Source Code [1]:
Compilation needed before executing a C program [2]:

b) What is *tokens in C*? Explain *search set*. Write a program in C to accept *only mobile number* of the format "+9779811223344". [1+2+2]

Tokens in C [1]:
Search Set [2]:
Program [2]:

3. a) Write a program in C to compute the return amount (A) given by the expression $A=P(i(1+i)^T/((1+i)^T-1))$ on investment of P amount of money for T numbers of year and at interest rate i. [5]

Program [5]:

b) What do you mean by *exit* controlled loop? WAP to compute monthly bill for given no. of units consumed by a customer: [1+4]

i) Minimum Rs. 80/- for up to 80 units.
ii) Rs. 7.30 per unit for next 100 units.
iii) Rs. 9.00 per unit for any units beyond 120 units.

Exit Controlled Loop [1]:
Program [4]:

4. a) List the components of function. Write a user-defined *calculatePower(float, int)* function to evaluate $y = x^n$ where y and x are floating point variable and n is an integer variable. [1+4]

Components of Function [1]:
Program [4]:

b) Differentiate recursion vs. iteration. [3]

Recursion vs. Iteration [6*0.5]:

5. a) Write a program to read order of a *square matrix* and its elements from keyboard. Find the sum of diagonal elements of the matrix. [5]

Program [5]:

b) What is *string*? What are the differences between *character array* and *string*? [3]

String [1]:
Character Array vs. String [4*0.5]:

6. a) What are *void pointer* and *bad pointers*? Illustrate with example that "Array is indirectly a pointer". [1+2]

Valid Pointer & Bad Pointer [1+1]:
Array is indirectly a pointer [2]:

b) Write a program to read two matrices of order *m*n* and *p*q*, multiply them and display the product matric using pointer. [5]

Program [5]:

7. a) What is *nested structure*? How does a *structure* differ from an *array*?

Nested Structure [1]: [1+2]

Structure vs. Array [4*0.5]:

b) Write a program to create a structure student having members name, roll number and address. Member name have first name, middle name & last name as its member. Create an array of objects of type student. Read the value of corresponding elements in main function and pass the array to function display() and display the information related to each member of the structure array. [5]

Program [5]:

8. a) Why are fwrite() & fread() functions used? Explain different types of *file operations* with examples. [2+3]

fwrite() & fread() [2*0.5+2*0.5]:

Syntax: fwrite(address_data, size_data, numbers_data, pointer_to_file);

Example: fwrite(&e, sizeof(struct Emp), 1, fptr);

Syntax: fread(address_data, size_data, numbers_data, pointer_to_file);

Example: fread(&e, sizeof(struct Emp), 1, fptr);

File Ops [6*0.5]: Creating, Opening, Closing, Reading, Writing, Searching

b) WAP that first appends records of five employees in a binary file and display the contents from file. The file name should be given by user and display message if it does not exit. [5]

Program [5]:

9. a) Differentiate *logical if* and *arithmetic if* with their syntax and uses. What are the difference data types on FORTRAN? [2+2]

Logical if vs. Arithmetic if [4*0.5]:

FORTRAN Data Types [4*0.5]:

b) Write a program in ForTran to evaluate $e^x = 1 + x + x^2/2! + x^3/3! + x^4/4! + x^5/5!$ … up to n terms. [4]

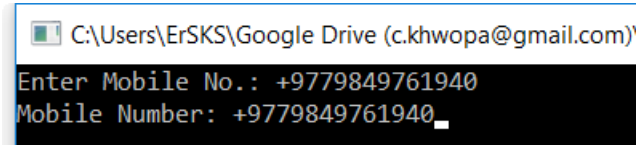
Program [5]:

```
      write(*,*)'Enter x & number of terms:'
      read(*,*) x,n
      term=1
      do 1 k=1,n,1
              term=term*x/k
              sum=sum+term
              write(*,*)'term ',k,':',term
1     continue
      write(*,*)'e^x = Sum of terms is: ',sum
      pause
      end
```

✪ ✪ ✪

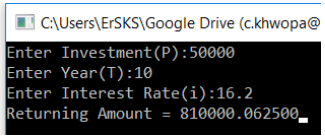
Q. 2 (b) **[2]**

```
#include<stdio.h>
#include<conio.h>
int main(){
	char mob[14];
	printf("Enter Mobile No.: ");
	scanf("%14[+0-9]",mob);
	printf("Mobile Number: %s",mob);
	getch();
	return 0;
}
```



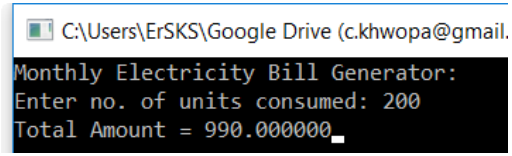
Q. 3 (a) **[5]**

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
int main(){
	float A, P, i, T;
	printf("Enter Investment(P):");
	scanf("%f",&P);
	printf("Enter Year(T):");
	scanf("%f",&T);
	printf("Enter Interest Rate(i):");
	scanf("%f",&i);
	A = P*(i*pow((1+i),T)/(pow((1+i),T)-1));
	printf("Returning Amount = %f",A);
	getch();
	return 0;
}
```



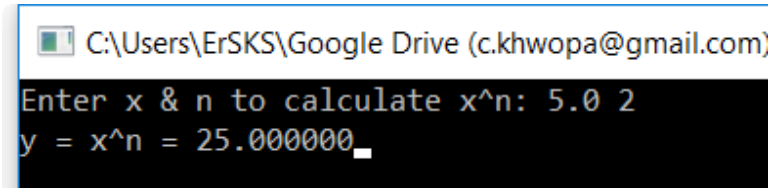
Q. 3 (b) **[4]**

```
#include<stdio.h>
#include<conio.h>
int main(){
	int u; float total;
	printf("Monthly Electricity Bill Generator:\n");
	printf("Enter no. of units consumed: ");
	scanf("%d",&u);
	if(u<=80){
		total = 80;
	}else if(u<=180){
		total = 80 + (u-80)*7.3;
	}else{
		total = 80 + 100*7.3 + (u-180)*9;
	}
	printf("Total Amount = %f",total);
	getch();
	return 0;
}
```



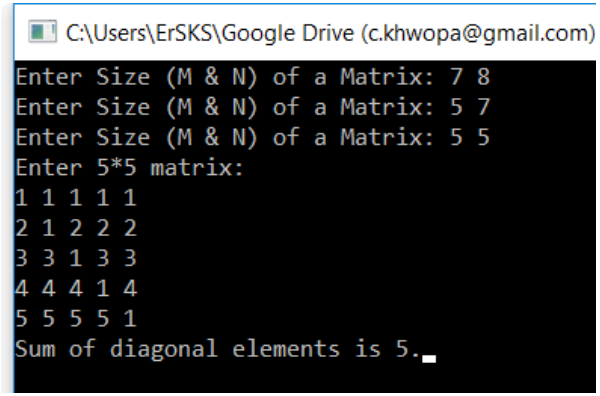
Q. 4(a) **[4]**

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
void calculatePower(float a, int b){
        float y;
        y = pow(a, b);
        printf("y = x^n = %f",y);
}
int main(){
        float x; int n;
        printf("Enter x & n to calculate x^n: ");
        scanf("%f%d",&x,&n);
        calculatePower(x,n);
        getch();
        return 0;
}
```



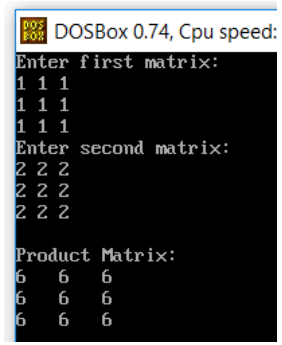
Q. 5(a) **[5]**

```
#include<stdio.h>
#include<conio.h>
int main(){
   int m,n,i,j,a[10][10],diagonal_sum=0;
   do{
        printf("Enter Size (M & N) of a Matrix: ");
        scanf("%d%d",&m,&n);
   }while(m!=n);
   printf("Enter %d*%d matrix:\n",m,n);
   for (i = 0; i < m; i++){
                for (j = 0; j < n; j++){
                   scanf("%d",&a[i][j]);
                   if(i==j){
                        diagonal_sum += a[i][j];
                   }
                }
   }
   printf("Sum of diagonal elements is %d.", diagonal_sum);
   getch();
   return 0;
}
```



Q. 6(b) **[5]**

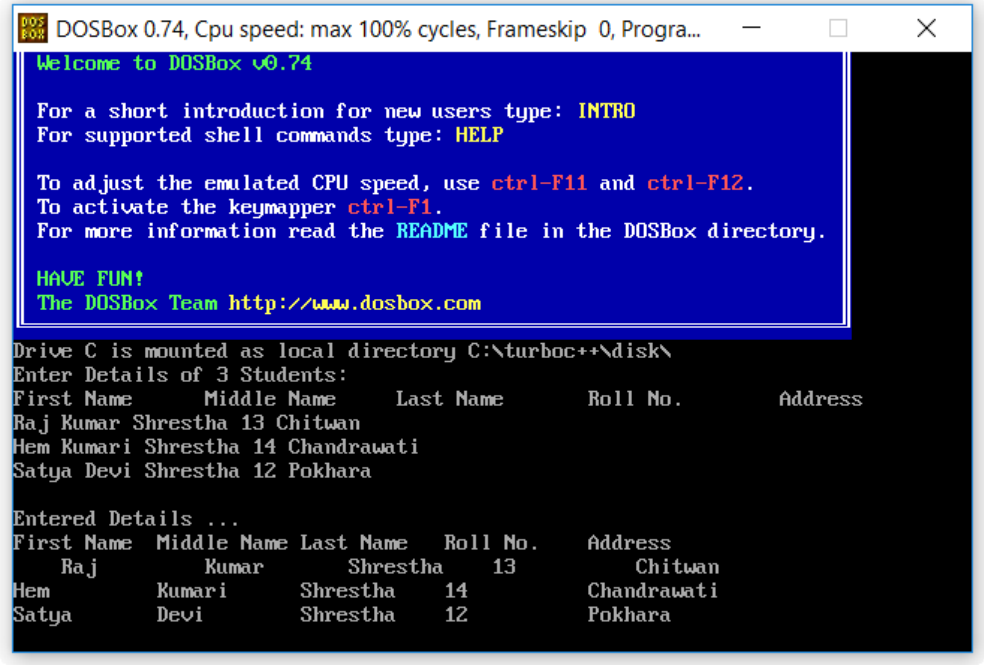
```
#include<stdio.h>
#include<conio.h>
#define M 3
#define N 3
#define P 3
#define Q 3
#define R 3
#define S 3
void matrixMul(int (*x)[N], int (*y)[Q], int (*z)[S]){
        int i, j, k;
        for (i = 0; i < M; i++){
        for (j = 0; j < N; j++){
                *(*(z+i)+j) = 0; //z[i][j] = 0;
                for (k = 0; k < S; k++){
                        //z[i][j] = z[i][j] + x[i][k] * y[k][j];
*(*(z+i)+j) = *(*(z+i)+j) + *(*(x+i)+k) * *(*(y+k)+j);
                }
        }
   }
}
int main(){
   int i, j;
   //int a[3][3], b[3][3];
   int (*a)[N], (*b)[Q], (*c)[S];
   clrscr();
   printf("Enter first matrix:\n");
   for (i = 0; i < M; i++){
                for (j = 0; j < N; j++){
                   //scanf("%d",&a[i][j]);
                   scanf("%d",*(a+i)+j);
                }
   }
   printf("Enter second matrix:\n");
   for (i = 0; i < P; i++){
                for (j = 0; j < Q; j++){
                   //scanf("%d",&b[i][j]);
              scanf("%d",*(b+i)+j);
        }
   }
   matrixMul(&a[0],&b[0],&c[0]);
   //Display Result
   printf("\nProduct Matrix:\n");
   for (i = 0; i < R; i++){
                for (j = 0; j < S; j++){
                        //printf("%-4d", c[i][j]);
                        printf("%-4d", *(*(c+i)+j));
        }
        printf("\n");
   }
   getch();
   return 0;
}
```



Q. 7(b) **[5]**

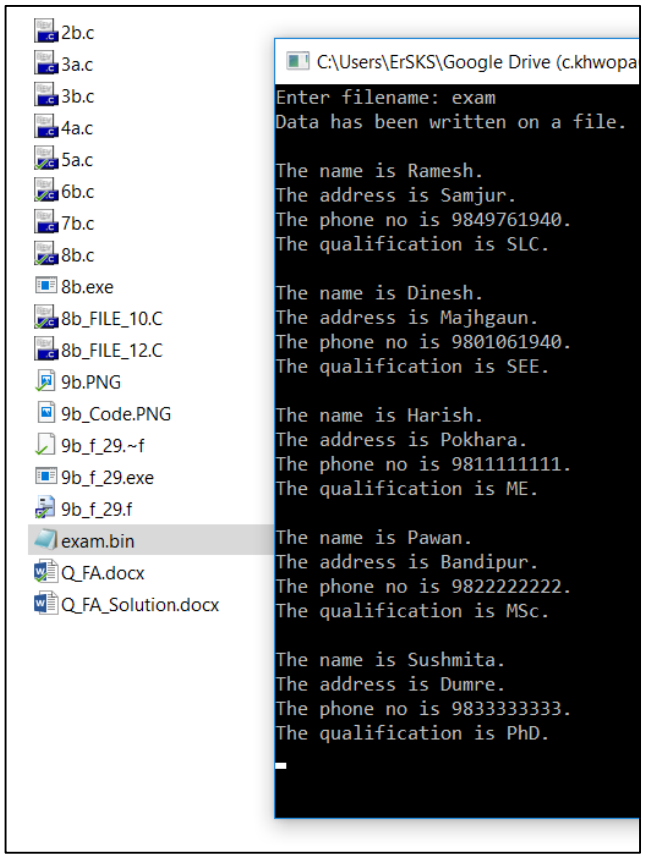
```
#include<stdio.h>
#include<conio.h>
struct name{
   char first_name[20];
   char middle_name[20];
   char last_name[20];
};
struct student{
   struct name n;
   int roll_no;
   char address[30];
};
void display(struct student std[3]);
int main(){
   int i;
   struct student s[3];
   printf("Enter Details of 3 Students:\n");
   printf("First Name\tMiddle Name\tLast Name");
   printf("\tRoll No.\tAddress\n");
   for(i=0;i<3;i++){
         scanf("%s%s%s%d%s",s[i].n.first_name,s[i].n.middle_name,
         s[i].n.last_name,&s[i].roll_no,s[i].address);
         fflush(stdin);
   }
   display(s);
   getch();
   return 0;
}
```

```
void display(struct student st[3]){
   int i;
   printf("\nEntered Details ...\n");
   printf("%-12s%-12s%-12s","First Name","Middle Name","Last Name");
   printf("%-12s%-12s","Roll No.","Address\n");
   for(i=0;i<3;i++){
      printf("%-12s%-12s%-12s%-12d%-12s\n",st[i].n.first_name,
      st[i].n.middle_name,st[i].n.last_name,st[i].roll_no,st[i].address);
   }
}
```



***Q. 8(b)* [5]**

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
struct HR{
        char name[10];  char address[15];
        char phone[11]; char qualification[10];
}e,h[5]={
        {"Ramesh","Samjur","9849761940","SLC"},
        {"Dinesh","Majhgaun","9801061940","SEE"},
        {"Harish","Pokhara","9811111111","ME"},
        {"Pawan","Bandipur","9822222222","MSc"},
        {"Sushmita","Dumre","9833333333","PhD"},
};
int main(){
        FILE *ftp;
        int i;
        char filename[20];
        printf("Enter filename: ");
        gets(filename);
        strcat(filename,".bin");
        ftp=fopen(filename,"ab+");
        if(ftp==NULL){
                printf("Cannot open a file.");
        }else{
                for(i=0;i<5;i++){
                        fwrite(&h[i],sizeof(struct HR),1,ftp);
                }
        }
        printf("Data has been written on a file.\n");
        rewind(ftp);
        for(i=0;i<5;i++){
                fread(&e,sizeof(struct HR),1,ftp);
                printf("\nThe name is %s.\n",e.name);
                printf("The address is %s.\n",e.address);
                printf("The phone no is %s.\n",e.phone);
                printf("The qualification is %s.\n",e.qualification);
        }
        fclose(ftp);
        getch();
        return 0;
}
```



Alternative:

Q. 8(b) **[5]**

```
#include<stdio.h>
#include<conio.h>
struct HR{
        char name[10];  char address[15];
        char phone[11]; char qualification[10];
}e[5],h[5]={
        {"Sujan","Solu","9849761940","SLC"},
        {"Sunil","Beni","9801061940","SEE"},
        {"Rabindra","Rara","9811111111","ME"},
        {"Ratna","Taplejung","9822222222","MSc"},
        {"Chandra","Pathivara","9833333333","PhD"},
};
int main(){
        FILE *ftp; int i;
        char filename[20];
        printf("Enter filename with extention: ");
        gets(filename);
        ftp=fopen(filename,"ab+");
        if(ftp==NULL){
                printf("Cannot open a file.");
        }else{
                fwrite(&h,sizeof(struct HR),5,ftp);
        }
        printf("Data has been written on a file.\n");
        rewind(ftp);
        fread(&e,sizeof(struct HR),5,ftp);
        for(i=0;i<5;i++){
                printf("\nThe name is %s.\n",e[i].name);
                printf("The address is %s.\n",e[i].address);
                printf("The phone no is %s.\n",e[i].phone);
                printf("The qualification is %s.\n",e[i].qualification);
        }
        fclose(ftp); getch(); return 0;
}
```