BUDDHA SERIES

(Unit Wise Solved Question & Answers)

Course – B.Tech (ASH)

College – Buddha Institute of Technology

(AKTU CODE-525)

Department: Applied Science and Humanities

Subject: Programming for Problem Solving (BCS-101/201)

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Unit – 4

Long Answer type question

1) Write a C program to sort set of integers in ascending order by using bubble sort technique?

(B.TECH-(SEM I) 2021-22, (SEM II)-2022-23)

Answer:-

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a[100],n,i,j,temp;
clrscr();
printf("enter the number of elements");
scanf("%d",&n);
printf("enter the elements");
for(i=0;i<n;i++)
{
scanf("%d",&a[i]);
}
for(i=0;i<n;i++)
{
for(j=0;j<n-i-1;j++)
{
if(a[j]>a[j+1])
{
temp=a[j];
a[j]=a[j+1];
a[j+1]=temp;
}
}
}
printf("sorted elements are");
for(i=0;i<n;i++)
{
printf("%d\t",a[i]);
}
getch();
}
```

- Illustrate recursion. Write a program in C to find GCD (Greatest Common Divisor) of two numbers using recursion**.**

(B.TECH-(SEM I) 2018-19)

Answer:-

Recursion: When a function calls itself then it is called as 'recursive function' or recursion.

Example:

```
recursion()
{
        printf("Recursion !");
        recursion();
}
```

Features:

- There should be at least one if statement used to terminate recursion.
- It does not contain any looping statements.

Advantages:

- It is easy to use.
- It represents compact programming structures.

Disadvantages:

- It is slower than that of looping statements because each time function is called

```
int gcd(int p, int q);
void main()
{
int x,y,z;
printf("Please Enter two integers:\n");
scanf ("%d%d",&x,&y);
z=gcd(x,y);
printf("Greatest Common Divisor of %d and %d is:%d\n",x,y,z);
getch();
}

int gcd(int p, int q)
{
```

```
Int  r, greater,smaller;
if (p>q)
greater=p,smaller=q;
else
greater=q,smaller=p;
if(smaller==0)
return greater;
else
r=gcd(smaller,greater);
return r;
}
```

- **3) Differentiate linear and binary search..**

(B.TECH-(SEM II) 2021-22)

Answer:-

a) Linear Searching: In linear search we compare the given element with the elements of an array one by one sequentially and see whether it is desired element or not. A Search will be unsuccessful if all the elements are accessed and the desired element is not found.

```
#include<stdio.h>
void  main()
{
int a[100],n,i,item,loc=-1;
clrscr();
printf("enter the number of elements");
scanf("%d",&n);
printf("enter the numbers:");
for(i=0;i<n;i++)
{
scanf("%d",&a[i]);
}
printf("enter the item to be searched");
scanf("%d",&item);
for(i=0;i<n;i++)
{
if(item==a[i])
{
loc=i;
break;
}
}
if(loc>=0)
printf("element is found in position%d %d",i+1,item);
```

```
else
printf("element is not found");
getch();
}
```

b) Binary Search: To do the binary search first we had to sort the array elements. The logic behind this technique is given below:

1) First find the middle element of the array.
2) Compare the mid element with an item.
3) There are three cases:
   a) if it is a desired element then search is successful.
   b) if it is less than desired element then search only the first half of the array.
   c) if it is greater than the desired element then search in the second half of the array.

Program:

```
void main()
  {
  int  a[100],n, i ,item, beg, end, mid;
  clrscr();
  printf("enter the number of elements");
  scanf("%d",&n);
  printf("enter the elements in sorted order");
  for(i=0;i<n;i++)
  {
  scanf("%d",&a[i]);
  }
  printf("enter the item to be searched");
  scanf("%d",&item);

  beg=0;
  end=n-1;
  mid=(beg+end)/2;
  while(beg<=end&&item!=a[mid])
  {
  if(item>a[mid])
  beg=mid+1;
  else
  end=mid-1;
  mid=(beg+end)/2;
  }
  if(a[mid]==item)
  printf("item is present in the list");
  else
  printf("item does not exist in the list");
  getch();
  }
```

4) **Declare a structure which contains the following members (roll no, name, father's name, age, marks) and write a program in C to list all students name which contain more than 75 marks.**
?

(B.TECH-(SEM II) 2019-20)

Answer:-

```
#include<stdio.h>

struct   student
{
int     rollno ,  age;
char   name[50],  fname[50];
float    marks;
}  s[100];

void main()
{
int i , n;
printf("enter the no of students :");
scanf("%d",&n);
printf("enter the records of studentrollno , age ,name ,fname ,marks :");
for(i=0 ; i<n ; i++)
{
scanf("%d%d%s%s%f",&s[i].rollno,&s[i].age,s[i].name,s[i].fname,&s[i].marks);
}
printf("record of the student are :");
for(i=0;i<n;i++)
{
printf("%d%d%s%s%f",&s[i].rollno,&s[i].age,s[i].name,s[i].fname,&s[i].marks);
}
printf("name of those student who scored more than 75 marks:");
for(i=0;i<n;i++)
{
if(s[i].marks>75)
printf("%s",s[i].name);
}
getch();
```

5) Also write a program that compares two given dates. To store date use structure say date that contains three members namely date, month and year. If the dates are equal then display message as "Equal" otherwise "Unequal"**?**

(B.TECH-(SEM II) 2021-22)

Answer:-

```
#include <stdio.h>

// Define a structure to store date
struct Date {
   int day;
   int month;
   int year;
};

// Function to compare two dates
int compareDates(struct Date date1, struct Date date2) {
   if (date1.day == date2.day && date1.month == date2.month && date1.year == date2.year) {
      return 1; // Dates are equal
   } else {
      return 0; // Dates are not equal
   }
}

int main() {
   struct Date date1, date2;

   // Input the first date
   printf("Enter first date (dd mm yyyy): ");
   scanf("%d %d %d", &date1.day, &date1.month, &date1.year);

   // Input the second date
   printf("Enter second date (dd mm yyyy): ");
   scanf("%d %d %d", &date2.day, &date2.month, &date2.year);

   // Compare the dates
   if (compareDates(date1, date2)) {
      printf("Equal\n");
   } else {
      printf("Unequal\n");
   }

   return 0;
}
```

6) Write a program to print the Fibonacci series using recursion**?**

(B.TECH-(SEM I) 2021-22)

Answer:-

```
#include <stdio.h>

// Function to calculate the nth Fibonacci number using recursion
int fibonacci(int n) {
    if (n <= 1) {
        return n;  // Base case: return n when n is 0 or 1
    }
    return fibonacci(n - 1) + fibonacci(n - 2);  // Recursive case
}

int main() {
    int n;
    // Input: number of terms in the Fibonacci series
    printf("Enter the number of terms: ");
    scanf("%d", &n);

    printf("Fibonacci Series: ");
    for (int i = 0; i < n; i++) {
        printf("%d ", fibonacci(i));
    }
    printf("\n");

    return 0;
}
```

7- Define a structure named employee. The structure should have the following element in it.

Employee Id(int type) , Name (characterarray) , Age (int) , Salary (float)

Answer:-

```
Struct    employee
{
int     id;
char    name[20];
int      age;
float    salary;
} emp1;
void main()
{
printf(“enter the  id \n”);
scanf(“%d”,&emp1.id);
printf(“enter the  name \n”);
scanf(“%s”,emp1.name);
printf(“enter the  age \n”);
```

```
 scanf(“%d”,&emp1.age);
 printf(“enter the  salary \n”);
 scanf(“%f”,&emp1.salary);
 getch();
 }
```

8) Write a program to find Factorial of a number using recursion**.**

(B.TECH-(SEM I) 2021-22)

Answer:-

```
#include <stdio.h>

long factorial(int );
void main()
{
 long  int  num ,f;
 printf("Enter a number to find factorial\n");
 scanf("%d", &num);
 f = factorial (num);
 printf("factorial = %ld\n",  f);
  }
  getch();
 }

long factorial(int n)
{
  if (n == 0)
   return 1;
  else
    return(n * factorial(n-1));
}
```