

Homework 6 - Questions

Q.1 Run the program for computing $\ln(x)$ from chap8(slide no.-13) for various choices of n and observe the result carefully (Here n is the number of rectangular strips). So what value of n will be a good choice, which will give value closest to *in-built log function of C++*?

Q.2 The following program will find the root of a function $f(x)=2x^2-y$ using Newton-Raphson Method (chap8 slide number20). Fill in the blank with appropriate expression.

```
#include<simplecpp>
main_program{
    double xi=1,y;
    cin>>y;
    repeat(10)
    {
        xi=.....;
    }
    cout<<xi<<endl;
}
```

Q.3 Consider the following function.

```
void starp( int n ){
    int i = 0;
    if(n>1)
        starp(n-1) ;
    for(i = 0; i< n; i++)
        cout << "*" ;
}
```

How many stars (*) will be printed?

Q.4 What does the following program do?

```
#include<simplecpp>
void funct(int n)
{
    if(n == 0)
    {
        cout<<"0";
        return;
    }
    funct(n/2);
    cout<<(n%2);
}

main_program{
    int n;
    cout<< "Enter no. : ";
    cin>>n;
    funct(n);
}
```

Q.5 What does the following function computes.

```
int recur(int x, int y)
{
    if(x == 0)
        return y;
    else
        return recur(x - 1, x + y);
}
```

Q.6 Consider the following C++ program fragment.

```
int myFunc1(); // Function declaration
```

```
#include<simplecpp>
```

```
int myFunc1() {  
    char c;  
    cin >> c;  
    if (c != 'X') {  
        myFunc1();  
    }  
    cout << c;  
    return;  
}
```

```
main_program {  
    cout << "Give a sequence of characters: ";  
    myFunc1();  
    myFunc1();  
}
```

How many times is the function myFunc1 called till the termination of the program, if we provide as input the following sequence of characters

abXbaaXbaaaX

Q.7 What does the following function return(answer in terms of x) -

```
int f(int x){  
    if(x%2==0)  
        return f(x/2)+1;  
    else return 0;  
}
```

Q.8 Write a recursive function to multiply two numbers (both positive). You can only use plus(+) operator.

Q.9 Write a program to print the factorial of a number using recursive function.

Q.10 If $a = bt + r$, for integers t and r , then $\gcd(a, b) = \gcd(b, r)$. Implement the above method for finding GCD using recursion.

Q.11 Write a recursive function to determine whether given array is Palindrome. The function shall be called as isPalin, It should have at max 3 arguments and should return true if array is Palindrome else false

Q.12 What is the output of the following program?

```
#include<simplecpp>
main_program
{
    char array[20];
    int i;
    for(i = 0; i < 5; i++){
        *(arr + i) = 65 + i;
    }
    *(array + i) = '\0';
    cout << array;
}
```

Q.13 Fill in the blanks of the following program such that it outputs 4?

```
#include<simplecpp>
main_program
{
    int arr[] = {1,2,3,4,5};
    int *p = __a__;
    cout << __b__ << endl;
}
```

Q.14 Giving the following declarations, which of the following statements are valid?

```
int i;
int *pi;
int ** q;
double d;
double *pd;
```

a. i=π b.*pi=&i; c. pd=π d. pd=i; e. pi=&i; f. q=π

Q.15 What will be the output of the following program?

```
#include<simplecpp>
main_program{
    int x=30, *x, *z;
    y=&x; // assume address of x is 500
    z=y;
    *y=*z++;
    x++;
    cout<<"x= "<<x<<endl<<"y= "<<y<<endl<<"z= ";
}
```

Q.16 The following program reverses an array. Fill in the blanks.

```
#include<simplecpp>
main_program
{
    int Arr[100],n,temp,i,j;

    cout<<"Enter number of elements you want to insert ";
    cin>>n;
    for(i=0;i<n;i++)
    {
        cout<<"Enter element "<<i+1<<":";
        cin>>Arr[i];
    }
    for(i=0,j=n-1;i<__a__; __b__, __c__)
    {
        temp=Arr[i];
        Arr[i]=Arr[j];
        Arr[j]=temp;
    }
    cout<<"\n Reversed array is"<<endl;
    for(i=0;i<n;i++)
        cout<<Arr[i]<<" ";
}
```

Q.17 Write a program to take 20 integers as input, and print the maximum integer out of them.

Q.18 What will be the output?

```
#include<simplecpp>
main_program
{
    int a=5,b=10,c=15;
    int * arr[ ]={&a,&b,&c};
    cout<<arr[1];
}
```

Q.19 A manufacturing company uses some cylinders to find precision of its diameter. The following are some of the codes to find mean and variance of diameter of the cylinders. Suppose, we use data stored in an array X of size 'n' to find mean and variance. Which code fragment/s will correctly give the desired output?.

1) float mean, sum = 0, variance = 0;
 for(int i=0; i<n; i++){
 sum += X[i];
 }
 mean = sum/n;
 for(int j=0; j<n; j++){
 variance += (X[j] – mean)* (X[j] – mean);
 }
 variance = variance/(n-1);

2) float mean = 0, variance = 0;
 for(int i=0; i<n; i++){
 mean += X[i]/n;
 }

```

for(int j=0; j<n; j++){
    variance += (X[j] - mean)* (X[j] - mean)/(n-1);
}

```

```

3) float mean, sum = 0, variance = 0;
for(int i=0; i<n; i++){
    sum += X[i];
}
mean = sum/n;
for(int j=0; j<n; j++){
    variance += (X[j] - mean)* (X[j] - mean);
}
variance = variance/n-1;

```

Q.20 Consider a 'n' degree polynomial. It can be represented as an array of coefficients as shown in the following example:

$$p(x) = 2x^3 + 3x^2 - 4x + 1$$

Array representation:

1 -4 3 2

Here only the coefficients are stored and the exponents are implicitly known from the index where a coefficient is located.

Consider the following two functions to calculate the value of a polynomial at a given point (for a given value of x). The functions take in the value of variable x and the coefficient array as parameters.

```

int func1(int x, int coeff[n+1]){

    int sum = 0;
    int term = 1;
    for(int i = 0; i < n+1; i++){

```

```

        for(int j = 0; j < i; j++){
            term = term * x;
        }
        term = term * coeff[i];
        sum = sum + term;
        term = 1;
    }
    return sum;
}

int func2(int x, int coeff[n+1]){
    int sum = 0;
    sum = coeff[n];
    for(int i=1; i < n+1; i++)
        sum = sum * x + coeff[n-i];
    return sum;
}

```

Which of the above function will give the correct output?

Q.21 What will happen in this code?

```

int a = 1, b = 2, c = 3;
int *ptr1 = &a, *ptr2 = &b, *ptr3 = &c;
int **sptr = &ptr1;
*sptr = ptr2;

```

- (A) ptr1 points to a
- (B) ptr1 points to b
- (C) sptr points to ptr2
- (D) None of the above

Q.22 Write a program to find the sum and average of one dimensional integer array. Take input of positive numbers from the user.

