

Homework 5 Questions

Q.1) Choose the correct options:

i) Each pass through a loop is called a/an:

- a. turn b. loop c. pass d. iteration

ii) Which is not a loop structure?

- a. for b. while c. repeat until d. do...while

iii) Which of the following creates an infinite loop?

- a. for(; ;)
b. while(; ;)
c. if(; ;)
d. do(; ;)

iv) What is the use of break statement?

- a. to terminate a case in switch statement
b. to force termination of a loop
c. exit the main program
d. all

Q.2) What will be the final value of x when the following code is run?

```
int x;  
for(x=0;x<10;++x)  
{  
}  
cout<<x;
```

Q.3)

```
#include<simplecpp>
```

```
main_program
```

```
{  
    for(int n = 10; n>0; n--)  
    {  
        if(n==5)  
            //Which statement goes here?  
            cout << n << ",";  
    }  
}
```

```
        return 0;
    }
```

Output: 10, 9, 8, 7, 6, 4, 3, 2, 1,

Q.4) Convert the following for loop into a while loop

```
for (x = 1; i <= 20; i = i + 2)
{
    cout << x;
}
```

Q.5) What is the output of the following code?

```
#include <simplecpp>
main_program{
    int i, j;
    i = 2;
    j = 4;
    while(--i && j++)
        cout << i << j;
}
```

Q.6) Is there any error in the following code? If no, find the output?

```
#include <simplecpp>
main_program{
    int i;
    for(i = 0; i <= 5; i++);
    cout << i;
}
```

Q.7) How many times is the loop condition in the for loop condition checked?

```
#include <simplecpp>
main_program{
    int m = 10;
    int i;
    for( i = 0; i < m; i++){
        m = m - 1;
    }
}
```

- (A) m-3 (B) m/2 (C) 5 (D) 6

Q.8) Number of times *while loop condition* is tested is, *i* is initialized to 0 in both case.

```
while (i < n)
    i++;
-----
do{
    i++;
}while (i < n);
```

- a) n, n
b) n, n+1
c) n+1, n
d) n+1, n+1

Q.9) What will be the output of program. Just go through the program execution and try to understand the use of *break* and *continue* statements.

```
#include<simplecpp>
main_program
{
    int i=0, j=-1, a=10;
    while(i<=10)
    {
        i++;
        if(j==20)
            break;
        j=i+j;
        continue;
        a++;
    }
    cout<<a<<"\t"<<i<<"\t"<<j; // "/t" is used for tab(space between output) only
}
```

- a. 21 11 66
b. 10 7 20
c. 10 11 66
d. 17 7 20

Q.10) How many times CS101 will print in the output of following program.

```
#include<simplecpp>
main_program
{
    int i=0,n;
    cin>>n;
    for( ; i<n; i++);
    {
        i++;
        cout<<" CS101 ";
    }
}
```

- a. n-2
- b. n
- c. 2
- d. 1

Q.11) What does the following code do? When does it terminate?

```
#include<simplecpp>
main_program{
    int n, sum=0;
    do {
        cout<<"Enter an integer: ";
        cin>>n;
        sum += n;
    }
    while(n != 0);
    cout<<"Total sum = "<<sum;
}
```

Q.12) Find any errors in the following function definitions:

- a. void multiply(int x,int y)
{
 cout<<(x*y);
 return(x*y);
}

```
b. int multiply(int x,y)
{
    return(x*y);
}
```

```
c. int sum(int x,void y)
{
    return (x+y);
}
```

Q.13) Write the output of the following program:

```
#include<simplecpp>
void function1(int A, int &B)
{
    A = A + B;
    B = A - B;
    A = A - B;
}
main_program
{
    int a = 4, b = 18;
    function1(a,b);
    cout << a << " " << b;
}
```

Q.14) Write a program to generate perfect numbers from 1 to 1000.

A perfect number is a positive integer that is equal to the sum of its proper positive divisors, that is, the sum of its positive divisors excluding the number itself.

Ex: $1+2+3 = 6$

Q.15) Write a program to print the sum of digits of a user input number, and then print the reverse of the number.

eg. input => 2345

output => sum is 14

reverse is 5432

Q.16) Given a non-negative integer entered by the user, write a program that finds the sum of all the factors of a given number (except the number itself)

Q.17) The 3-digit number, 153, has the following interesting property: $1^3 + 5^3 + 3^3 = 153$. Such numbers are called Armstrong numbers. Write a program using for/while (or both) loops to print all such 3-digit Armstrong numbers.

Q.18) A CS101 student is very curious to find out the largest number which can be represented using int type. He tries to do it using a while loop but is unable to write the code completely.

```
#include<simplecpp>
main_program{
    int i=0; // stores the value of largest number present in int
    /* ---Missing Part---*/
}
```

Help him by replacing the missing part .

(A) while(true)

```
{
    i = i + 1;
}
```

(B) int t = 1;

```
while( t > i )
{
    t = t + 1;
}
```

(C) while((i + 1) > i)

```
{
    i = i + 1;
}
```

(D) while(i == i)

```
{
    i = i + 1;
}
```

Q.19) Russian Farmer's Multiplication : Centuries back, apparently the following algorithm was used for multiplying two positive numbers. This is explained using an example where we wish to find 29×49 . The farmer will gather enough pebbles and make two heaps, pile1 of 29 pebbles and pile2 of 49 pebbles. Then she would continuously halve pile1 and double pile2. In case she cannot exactly halve pile1 (odd number) she would throw away one pebble and then retain the half. The process stops when there is only one pebble left. Then she adds all the pebbles in those pile2 numbers, which correspond to the pile1 having an odd number.

Process	Pile1	Pile2	Sum
Start	29	49	49
Next Step	14	98	49
Next Step	7	196	245
Next Step	3	392	637
Final Step	1	784	1421

The answer is therefore 1421. A programmer wants to implement this method through coding. Help him choose the correct snippet

```
# include <simplecpp>
main_program(){
    int m,n;
    cin >> m >> n;
    int sum = 0;
    /* Attach snippet here */
}
```

```
(A) while(m >= 1){  
    m = (m-1)/2;  
    n = 2*n;  
    if(m % 2 != 0){  
        sum = sum + n;  
    }  
}
```

```
(B) while(m > 1){  
    m = m/2;  
    if(m % 2 != 0){  
        sum = sum + n;  
    }  
    n = 2*n ;  
}
```

```
(C) while(m > 1){  
    m = (m-1)/2;  
    n = 2*n;  
    if(m % 2 != 0){  
        sum = sum + n;  
    }  
}
```

```
(D) while(m != 1){  
    if(m % 2 != 0){  
        sum = sum + n;  
    }  
    m = m/2;  
    n = 2*n ;  
}
```

(E) None Of These

Q.20) What is the output of the following program?

```
#include <simplecpp>
int func(int x){
    if(x>0){
        cout << func(x-1) << endl;
        x--;
    }
    return x;
}

main_program{
    cout << func(5) << endl;
}
```

Q.21) What is the output of the following program?

```
#include <simplecpp>
int func(int x){
    if(x>0){
        cout << func(--x) << endl;
    }
    return x;
}

main_program{
    int govind = 5;
    cout << func(govind) << endl;
}
```

Q.22) Write a function isPrime() that takes an integer as parameter and returns true if the integer is prime else false.

Q.23) Write another function printPrimes() which takes two integers as arguments and prints all the prime numbers between them(inclusive). Use the function written in above question as well.

