

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

Section A – To be answered on the last page, detach and return in 20 minutes

SN	Question # 1
1.	<p>What does the following line of code represent?</p> <p>void func(int);</p> <p>A. Function definition</p> <p>B. Function header</p> <p>C. Function prototype</p> <p>D. Function call</p> <p>E. None of the above</p>
2.	<p>From the functions shown below, which ones are overloaded?</p> <p>i. void func (int);</p> <p>ii. double func(int);</p> <p>iii. bool func(int);</p> <p>A. i</p> <p>B. i and ii</p> <p>C. ii</p> <p>D. i, ii and iii</p> <p>F. None of the above</p>
3.	<p>What is the scope of the variable declared in a user defined function?</p> <p>A. Whole program</p> <p>B. Only inside the function block</p> <p>C. The main function</p> <p>D. All of the above</p> <p>E. None of the above</p>
4.	<p>Which of the following statement is correct?</p> <p>A. Only one parameter of a function can be a default parameter.</p> <p>B. Minimum one parameter of a function must be a default parameter.</p> <p>C. All the parameters of a function can be default parameters.</p> <p>D. No parameter of a function can be default</p> <p>E. None of the above</p>
5.	<p>Which of the following is not a good programming choice?</p> <p>A. Local variable</p> <p>B. Default parameters</p> <p>C. Global variables</p> <p>D. Global constants</p> <p>E. Static variables</p>

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

6.	<p>Which of the following function declaration using default arguments is incorrect?</p> <ul style="list-style-type: none">i. <code>int foo(int x, int y =5, int z=10)</code>ii. <code>int foo(int x=5, int y =10, int z)</code>iii. <code>int foo(int x=5, int y, int z=10)</code> <p>A. i and ii B. ii C. iii D. ii and iii E. i, ii and iii</p>
7.	<p>Which of the following statements is correct?</p> <ul style="list-style-type: none">i. The body of a function should have only one return statementii. The body of a function may have many return statementsiii. A function can only return one value to the calling environment <p>A. i and ii B. i and iii C. ii and iii D. i, ii and iii E. None of the above</p>
8.	<p>Assume that the integer data type only takes 4 bits in the memory. Which of the following statement will be correct:</p> <p>A. Maximum value of signed integer variable will be 16 B. Maximum value of unsigned integer variable will be 16 C. Minimum value of signed integer variable will be -8 D. Maximum value of signed integer variable will be 8</p>
9.	<p><< is called:</p> <p>A. Output operator B. Stream Insertion operator C. Stream Extraction operator D. Stream operator</p>
10.	<p>If size of long long data type is 8 bytes, then size of unsigned long long will be</p> <p>A. 8 bytes B. 16 bytes C. long long data type does not exist D. none of the above</p>
11.	<p>#define is processed by</p> <p>A. Assembler B. Compiler C. Pre-processor D. Linker</p>

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

12.	cout<<(int)9.0 % 2; will display A. 4 B. Syntax error C. 1 D. 4.5
13.	int a=2, b=3; a = 2 + (b =5); //what are the correct values of a and b A. a=2 and b =3 B. a=3 and b =3 C. a=7 and b =3 D. a=7 and b =5
14.	Consider the following statements: int x = 22,y=15; x = (x>y) ? (x+y) : (x-y); What will be the value of x after executing these statements? A. 22 B. 37 C. 7 D. Error. Cannot be executed
15.	What will be the out of the following code: int x=1, y=5; if (x = 7) cout<<x; else cout<<y; A. 1 B. 7 C. 5 D. None of the above
16.	Which of the following is an illegal variable name? A. X B. 99bottles C. july97 D. theSalesFigureForFiscalYear98 E. grade_report

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

17.	<p>Which of the following is NOT a character literal?</p> <ul style="list-style-type: none">A. 'C'B. "C"C. '\\'D. '1'E. Option B and D
18.	<p>Which of the following statements is correct?</p> <ul style="list-style-type: none">A. #include (iostream)B. #include {iostream}C. #include <iostream>D. #include [iostream]E. All of the above
19.	<p>Which of the following are not valid assignment statements?</p> <ul style="list-style-type: none">A. total = 9;B. 72 = amount;C. profit = 129D. letter = 'W';
20.	<p>A(n) _____ is like a variable, but its value is read-only and cannot be changed during the program's execution.</p> <ul style="list-style-type: none">A. secure variableB. uninitialized variableC. named constantD. locked variable

SECTION-B

Question # 2 [45 Marks (3 marks for each part)]

Write the output of the following C++ codes in the corresponding output column (if the code is correct). If you find any errors in the code, please explain the errors, correct them and after that write output of the corrected code. Assume that the header files are included in each code snippet.

C++ Program	Output/Errors and Corrected
<pre>bool f(int x){ cout<<x<<endl; if (x=6) return false; else return true; } int main (){ cout<<f(6)<<endl; cout<<f(10); }</pre>	<pre>6 0 10 0</pre>
<pre>int main(){ bool flag = sizeof(char); IF (!flag) { cout << "exit" << endl; } else { cout << sizeof('Q') << endl; cout << sizeof("Sales") << endl; cout << sizeof('\n') << endl; } return 0; }</pre>	<pre>Change IF to if 1 6 1</pre>
<pre>int main() { int a=0, b=2, c=1, d=4; bool f, g, h; char ch1 = 'a'; //ASCII 'a' = 97 a = (b + c) *(ch1 + d); cout << a << endl; f = (g = a + b) >= c; cout << f << endl; h = g == (d - 1); cout << h << endl; ch1 = ch1 + 1; cout << int(ch1); return 0; }</pre>	<pre>303 1 0 98</pre>

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

<pre>int foo(int a) { cout << a * 5 << endl; } int foo(int); int main() { int x = 90.6; foo(x); return 0; }</pre>	<p>450</p>
<pre>int doWork(int); int x = 16; int y = 16; int z = 20; int main() { int t = 99; int x = 10; int y = 20; y *= doWork(4) + 2; cout<<x<<"\t"<<y<<"\t"<<"\t"<<z<<endl; return 0; } int doWork(int w = 8) { x /= z - y + w; return x; }</pre>	<p>10 <tab space> 80 <2 tab spaces> 20</p>
<pre>int f(int c) { if (c < 0) return -c; return c; } int main() { int a = 15, b = 20; cout <<(((a + b)+f(a - b))/2)<<endl; cout<<(((a + b)-f(a - b))/2)<<endl; return 0; }</pre>	<p>20 15</p>
<pre>int main() { int w=7, x=4, y=6, z=3, a=0, b=0; a=(y < x)?x*y:(z>w)?x-y:y-x; b=(x > z)?(y > w)?z%w : w%z : y%x; cout << a << endl << b << endl; return 0; }</pre>	<p>2 1</p>

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

<pre>void foo(int x, int y=0, int z) { int res = x * y * z; cout<< res; } int main(){ foo(2,3,5); return 0; }</pre>	<p>Error in using default parameter, either add z=0 or remove y=0</p> <p>30</p>
<pre>int func(int x){ return x % 4 + 1; } int main(){ int b=5; int y= 2 + func(3*b+1); int z = func(func(y)); cout<<y<<" - "<<z; }</pre>	<p>3 - 1</p>
<pre>bool foo(int x){ static int a = 0; a = a+1; if((x>=0) && (a%2==0)) return true; else return false; } int main (){ cout<<foo(4); cout<<foo(5); cout<<foo(4); }</pre>	<p>010</p>
<pre>void func1(){ cout<<"In function 1"<<endl; func2(); } void func2(){ cout<<"In function 2"<<endl; func1(); } int main(){ func1(); func2(); }</pre>	<p>Declare prototypes first</p> <p>In function 1</p> <p>In function 2</p> <p>In function 1</p> <p>(infinite calls)</p>
<pre>int main(){ int flag = (int(1.5 + 6) % 4); if (!flag) cout<<"*"<<(5>=6 1<8 && 9==7)<<endl; cout <<"@"<<(5+1==6 8-1 >4)<< endl; return 0; }</pre>	<p>@1</p>

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

<pre>void foo(int x, int y=5, int z=7) { int a = x % y * z; cout<< a; } int main(){ foo(3); }</pre>	<p>21</p>
<pre>void foo(int x, int y=5, int z=7) { int a = x % y * z; cout<< a<<endl; } void foo(float x, float y=5, float z=7) { int a = x % y * z; cout<< a<<endl; } int main(){ foo(1,9); foo(7.8,8); }</pre>	<p>Mod operator does not allow float Cast to int -> int a = (int)x % (int)y * z;</p> <p>7 49</p>
<pre>int a = 100; void f() {cout<<a<<endl;} int main() { a += 200; cout<<a<<endl; int a=500; cout<<a<<endl; { int a; a = 400; cout<<a<<endl; a *= 2; } f(); a += 25; cout<<a<<endl; { cout<<a<<endl; } return 0; }</pre>	<p>300 500 400 300 525 525</p>

SECTION-C (Full Programs)

Question # 3:	12 marks
<p>Write a program that determines which of five geographic regions within a major city (north, south, east, west, and central) had the fewest reported automobile accidents last year. It should have the following two functions, which are called by main:</p> <ul style="list-style-type: none">• <code>getNumAccidents()</code> is passed the name of a region. It asks the user for the number of automobile accidents reported in that region during the last year, validates the input, then returns it. It should be called once for each city region.• <code>findLowest()</code> is passed the five accident totals. It determines which is the smallest and prints the name of the region, along with its accident figure. Assume that first passed value corresponds to the first city and so on. <p>Input Validation: Do not accept an accident number that is less than 0. If user enters a negative value, tell him/her to re-enter. If a wrong value entered again, program should exit.</p>	
<pre>#include <iostream> using namespace std; int getNumAccidents(string city) { int accidents; cout<<"Enter number of accidents reported in "<<city<<" over the past 1 year : "; cin>>accidents; if (accidents<0) { cout<<"Invalid input. Please enter a non-negative number : "; cin>>accidents; } return accidents; } int findLowest(int a1, int a2, int a3, int a4, int a5) { int lowest = a1; if (a2<lowest) lowest = a2; if (a3<lowest) lowest = a3; if (a4<lowest)</pre>	

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

```
lowest = a4;

if (a5<lowest)
    lowest = a5;

return lowest;
}

int main (){
    string c1="North",c2="South",c3="East",c4="West", c5="Central";
    int a1,a2,a3,a4,a5,l;

    a1 = getNumAccidents(c1);
    a2 = getNumAccidents(c2);
    a3 = getNumAccidents(c3);
    a4 = getNumAccidents(c4);
    a5 = getNumAccidents(c5);

    if (a1<0 || a2<0 || a3<0 || a4<0 || a5<0)
    {
        cout<<"Invalid input multiple times. Try again";
        return 0;
    }

    l = findLowest(a1,a2,a3,a4,a5);
    if (l==a1)
        cout<<c1<<" had "<<l<<" accidents last year";

    else if (l==a2)
        cout<<c2<<" had "<<l<<" accidents last year";

    else if (l==a3)
        cout<<c3<<" had "<<l<<" accidents last year";

    else if (l==a4)
        cout<<c4<<" had "<<l<<" accidents last year";

    else if (l==a5)
        cout<<c5<<" had "<<l<<" accidents last year";

}
```

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

Question # 4:

12 marks

A palindrome is a number or a text phrase that reads the same backward as forward. For example, each of the following five-digit integers is a palindrome: 12321, 44444, 34443, 11611. Write a C++ function `isPalindrome ()` that takes a five-digit integer as argument and returns true or false by determining whether it's a palindrome or not.

Note: You have to write the complete C++ program including main function.

```
#include <iostream>
using namespace std;
```

```
/*
```

Function usage: prototype, call, parameter and return types = 4 marks

Proper indentation = 1 marks

Proper input/output statements (+validation) = 2 mark

Error free, Good Program = 1 mark

Program logic and approach = 4 marks

```
*/
```

```
bool isPalindrome(int n);
```

```
c
```

```
int main()
```

```
{
```

```
    int number = 0;
```

```
    cout<<"Enter a number : ";
```

```
    cin>>number;
```

```
    if (number<=9999 || number>99999)
```

```
    {
```

```
        cout<<"You did not enter a positive 5 digit integer";
```

```
        return 0;
```

```
    }
```

```
    if (isPalindrome(number)==true)
```

```
        cout<<number<<" is a Palindrome"<<endl;
```

```
    else
```

```
        cout<<number<<" is NOT a Palindrome"<<endl;
```

```
}
```

```
bool isPalindrome(int n)
```

```
{
```

```
    short d1,d2,d3,d4,d5;
```

```
    d1 = n / 10000;
```

```
    n = n%10000;
```

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

```
d2 = n / 1000;  
n = n%1000;  
  
d3 = n / 100;  
n = n%100;  
  
d4 = n / 10;  
n = n%10;  
  
d5 = n / 1;  
n = n%1;  
  
if (d1==d5 && d2==d4)  
    return true;  
else  
    return false;  
  
}
```

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

Question # 5:

12 marks

Consider a factory where the employees can be categorized into three types 1) *Full-time* 2) *Parttime*, and 3) *Adhoc*. An employee who works for 25 to 30 days of the month is considered as fulltime employee, 15 to 24 days is considered as Part-time employee, and the employee is considered *Adhoc* is he works for less than 15 days.

Write a C++ program that calculates the salary of the employee, tax deductions, and net-payable amounts. Also, the program should print the average salaries of Full-time, Part-time, and Adhoc employees. Consider a working day equal to 8 hours.

The program should take input of employee's data as the number of days. The tax deducted and payment rates are as follows: Full-Time employee (900 per hour, 5% tax deduction), Part-time (850 per hour, 7% tax deduction), and Adhoc (600 per hour, 10% tax deduction).

```
#include <iostream>
using namespace std;
```

```
/*
```

Constants declared = 1 marks

Proper indentation = 1 marks

Proper variable types, names and initialization = 2 marks

Proper input/output statements (+validation) = 2 mark

Error free, Good Program = 1 mark

Program logic and approach = 5 marks

NOTE: AVERAGE CALCULATION IS NOT NEEDED

```
*/
```

```
const int FT_RATE_PER_HOUR = 900; //Full Time
```

```
const int FT_TAX_PERCENT = 5; //Full Time
```

```
const int PT_RATE_PER_HOUR = 850; //Part Time
```

```
const int PT_TAX_PERCENT = 7; //Part Time
```

```
const int AD_RATE_PER_HOUR = 600; //Adhoc Time
```

```
const int AD_TAX_PERCENT = 10; //Adhoc Time
```

```
const int WORKING_DAY = 8;
```

```
int main()
```

```
{
```

```
    int days = 0, salary=0;
```

```
    float tax=0, payable=0;
```

```
    cout<<"Enter number of days an employee worked : ";
```

```
    cin>>days;
```

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

```
if (days>=25 && days<=30) //Full Time
{
    salary = days * WORKING_DAY * FT_RATE_PER_HOUR;
    tax = (float)FT_TAX_PERCENT/100 * salary;
    payable = salary - tax;
}
else if (days>=15 && days<=24) //Part time
{
    salary = days * WORKING_DAY * PT_RATE_PER_HOUR;
    tax = (float)PT_TAX_PERCENT/100 * salary;
    payable = salary - tax;
}
else if (days>=0 && days<=14) // Adhoc
{
    salary = days * WORKING_DAY * AD_RATE_PER_HOUR;
    tax = (float)AD_TAX_PERCENT/100 * salary;
    payable = salary - tax;
}
else
{
    cout<<"You entered invalid number of days.";
    return 0;
}

cout<<"Salary of the employee : "<<salary<<endl;
cout<<"Tax payable : "<<tax<<endl;
cout<<"Net Payable Salary : "<<payable<<endl;
}
```

National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2021

Islamabad Campus

S. No	Correct Choice	S. No	Correct Choice
1.	C	11.	C
2.	F	12.	C
3.	B	13.	D
4.	C	14.	B
5.	C	15.	B
6.	D	16.	B
7.	C	17.	B
8.	C	18.	C
9.	B	19.	B
10.	A	20.	C