

Tutorial 1 – C/C++ Primer

Question 1: What is the output of the following code? Explain your answer.

```
char str[5] = "ABC";  
cout << str[3] << str[4];  
cout << str;
```

Question 2: What is the output of the following code? Explain your answer.

```
int a = 1, b = 2, c = 3;  
int *arr[3] = { &a, &b, &c };  
cout << *arr[( *arr[2] )-- - 3];  
cout << c;
```

Question 3: (a) Declare a dynamic array of pointers (to integers) of size 10?

(b) What happens when **delete** is used with a NULL pointer? What if we call **delete** twice on the same pointer?

Question 4: Consider the following recursive function fun(x, y). What is the value of fun(3, 2) ? List the recursive function calls.

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

Question 5: "for" loops can always be re-written as "while" loops, and vice-versa. Are the following two codes equivalent, and what is their output? Explain your answer, and run the codes to check.

(a)

```
int count = 1;  
for (; count <= 5 ; count++)  
{  
    int count = 1;  
    cout << count << "\n";  
}  
return 0;
```

(b)

```
int count = 1;  
while (count <= 5)  
{  
    int count = 1;  
    cout << count << "\n";  
    count++;  
}  
return 0;
```

Question 6: Given `int x = 0` and the following functions:

```
void f(int x) {
    x++;
    return;
}
void g(int &x) {
    x++;
    return;
}
void h(const int &x) {
    x++;
    return;
}
```

What is the value of x after each function call f(x), g(x) and h(x)?

Question 7: What is the output of the following program? Correct the program if there is any compile time error.

```
#include <iostream>
using namespace std;
class Test {
    int x;
    Test() { x = 5;}
};
int main() {
    Test *t = new Test();
    cout << t->x;
}
```

Question 8: What is the value of q[2] and p[1][2] after each call to `delete`?

```
#include <iostream>
using namespace std;
int main() {
    int **p = new int*[5];
    int *q = new int[5];
    for (int i = 0; i < 5; i++) {
        q[i] = i;
    }
    p[1] = q;
    delete p;
    delete q;
    delete [] q;
}
```



Question 9: Given `int x = 15`, and the following recursive function `fun(n, &ptr)` . What is the value of `fun(5, &x)` ?

```
int fun(int n, int *f_p) {  
    int t, f;  
    if (n <= 1){  
        *f_p = 1;  
        return 1;  
    }  
    t = fun(n- 1, f_p);  
    f = t+ * f_p;  
    *f_p = t;  
    return f;  
}
```