“Introduction to C++ Programming” Online Course

Pretest/Posttest for Class 7

1. Consider the following program to input a date in the format of mm-dd-yyyy, such as 10-22-2001. What happens if the user inputs by accident 10 22-2001? What happens if the user enters 10-22 2001? What happens if the user enters 10a22a2001?

```cpp
int month, day, year, c;
cin >> month >> c >> day >> c >> year;
```

What would be the results of these three user entries if the input operation had been coded this way?

```cpp
cin >> month;
cin.get (c);
cin >> day;
cin.get (c);
cin >> year;
```

2. Why does this program create a linker error when building the program? How should it be fixed?

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

int SumFunction (int& counter);
int main () {
    int x = 42;
    int sum = SumFunction (x);
    return 0;
}

int SumFunction (int counter) {
    int j;
    int sum = 0;
    for (j=0; j<counter; j++)
        sum += j;
    return sum;
}
3. What is wrong with the first `if` statement highlighted in boldface? How can it be made to work correctly so that `result` contains the correct value, ignoring leap year troubles?

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

const int ERROR = -1;

int ValidateDate (int month, int day, int year);

int main () {
    int mon = 10;
    int day = 32;
    int yr = 2000;
    int result;
    if (result = ValidateDate (mon, day, yr) == ERROR)
        cout << "Bad Date\n" ...

    int ValidateDate (int m, int d, int y) {
        if (m < 1 || m > 12 || d < 1 || d > 31 || y < 1900)
            return ERROR;
        else
            return 1;
    }
}
```

4. When this program is executed, why do very unpredictable actions occur? How can it be fixed so that it works properly?

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

void InputDate (iostream in, int& month, int& day, int& year);

int main () {
    int month, day, year, quantity;
    double cost;
    InputDate (cin, month, day, year);
    ...

    void InputDate (iostream in, int& month, int& day, int& year) {
        char c;
        in >> month;
        in.get (c);
        in >> day;
        in.get (c);
```
5. When this program is executed, why do very unpredictable actions occur? How can it be fixed so that it works properly?

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

iostream InputDate (iostream& in, int& month, int& day,
                   int& year);

int main () {
    int month, day, year, quantity;
    double cost;
    while (InputDate (cin, month, day, year)) {
        cin >> quantity >> cost;
        ...
    }
}
```

6. When this program runs, why does `main`'s `cout` produce erroneous results? How can it be fixed?

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

void InputDate ();

int month, day, year;

int main () {
    int month, day, year;
    InputDate ();
    cout << month << '-' << day << '-' << year;
    ...
}
```

```cpp
void InputDate () {
    char c;
    cin >> month >> c >> day >> c >> year;
}
7. When this program runs, why does main’s cout produce erroneous results? How can it be fixed?

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

void InputDate ();

int month, day, year;

int main () {
  int month, day, year;
  InputDate ();
  cout << month << '-' << day << '-' << year;
  ...
}

void InputDate () {
  int month, day, year;
  char c;
  cin >> month >> c >> day >> c >> year;
}
```

8. This `outputDate()` function is badly designed. Why? How can it be repaired?

```c++
#include <iostream>
#include <iomanip>
using namespace std;

ostream& OutputDate (ostream& out, int& m, int& d, int& y);

int main () {
  int month, day, year;
  ...
  OutputDate (cout, month, day, year);
  ...
}

ostream& OutputDate (ostream& out, int& m, int& d, int& y){
  out << setw (2) << setfill ('0') << m << '-'
       << setw (2) << d << '-' << setw (4) << y
       << setfill (' ');
  return out;
}
9. When this program is run, a strange, often large, number appears after the correct date on the screen. Why? How can it be removed?

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

ostream& OutputDate (ostream& out, int& m, int& d, int& y);

int main () {
    int month, day, year, quantity;
    ...
    cout << OutputDate (cout, month, day, year) << " "
         << setw (10) << quantity;
    ...
}

ostream& OutputDate (ostream& out, int& m, int& d, int& y){
    out << setw (2) << setfill ('0') << m << '-'
        << setw (2) << d << '-' << setw (4) << y
        << setfill (' ');
    return out;
}
```

10. What will `cout` display for the variable `c`? for `b`? for `a`?

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

int Fun (int a, int &b);

int main () {
    int a = 1;
    int b = 2;
    int c = 3;
    c = Fun (a, b);
    cout << c << " " << b << " " << a;
    return 0;
}

int Fun (int a, int &b) {
    a = 42;
    b = 42;
    return 42;
}
11. What are the contents of `main`'s variables `a` and `b` after the first call to `fun`? What are the contents of `a` and `b` after the second call to `fun`?

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

void Fun (double &x, double y);

int main() {
    double a = 1, b = 2;
    Fun (a, b);
    Fun (b, a);
}

void Fun (double &x, double y) {
    x += y;
    return;
}
```

12. What values are printed for `x`, `y` and `z` in `SomeFun` the first time that function is called? What values are printed the second time it is called?

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

void SomeFun () {
    int y = 2;
    static int z = 3;
    SomeFun();
    x +=10;
    y +=10;
    z +=10;
    SomeFun();
    return 0;
}

void SomeFun () {
    int y = 2;
    static int z = 3;
    cout << x << " " << y << " " << z;
    x++;
    y++;
    z++;
}
```