Chapter 3 Smith Exercises and Labs
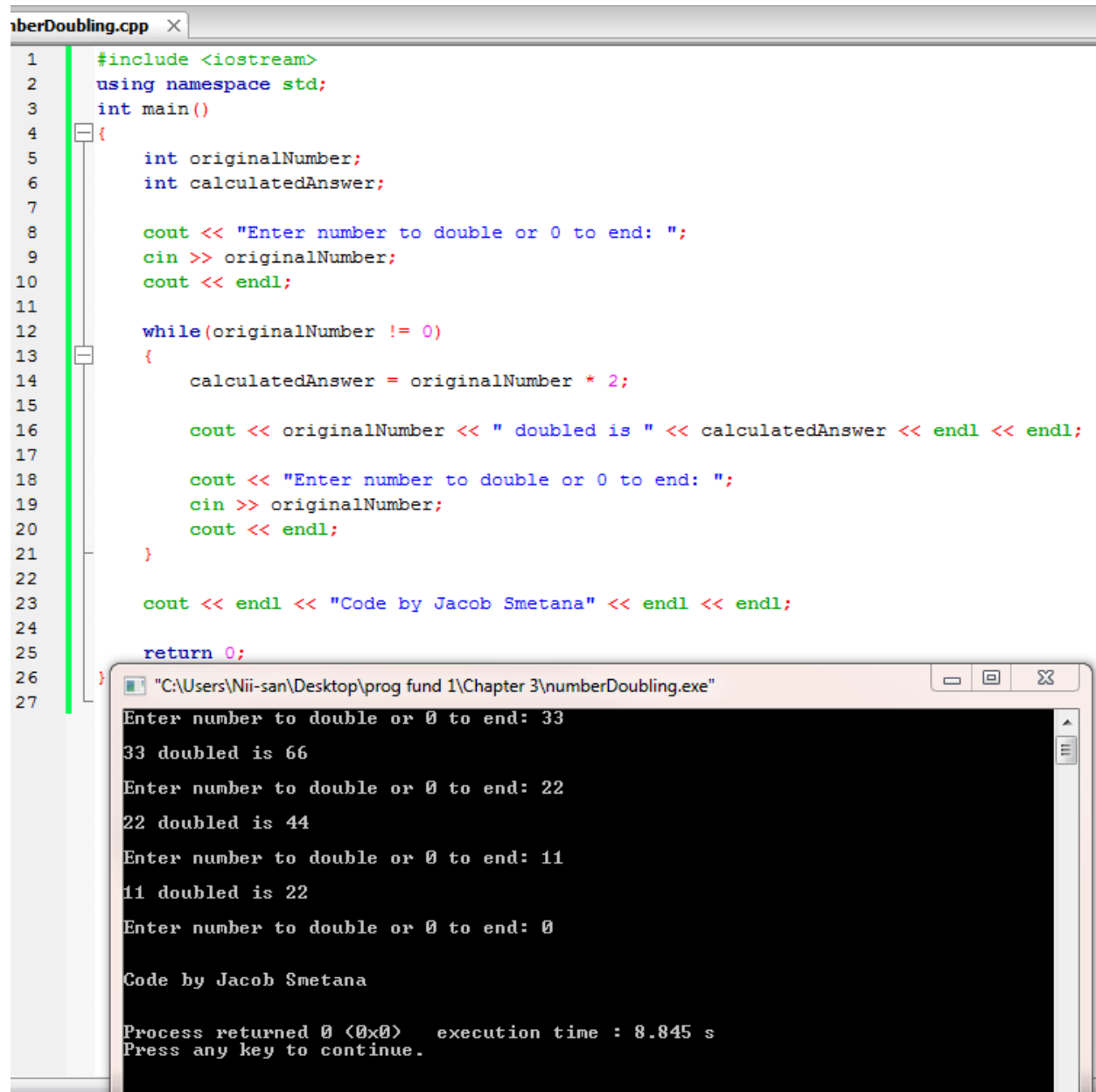
1. Number Doubling program

```cpp
#include <iostream>
using namespace std;
int main()
{
    int originalNumber;
    int calculatedAnswer;

    cout << "Enter number to double or 0 to end: ";
    cin >> originalNumber;
    cout << endl;

    while(originalNumber != 0)
    {
        calculatedAnswer = originalNumber * 2;

        cout << originalNumber << " doubled is " << calculatedAnswer << endl << endl;

        cout << "Enter number to double or 0 to end: ";
        cin >> originalNumber;
        cout << endl;
    }

    cout << endl << "Code by Jacob Smetana" << endl << endl;

    return 0;
}
```
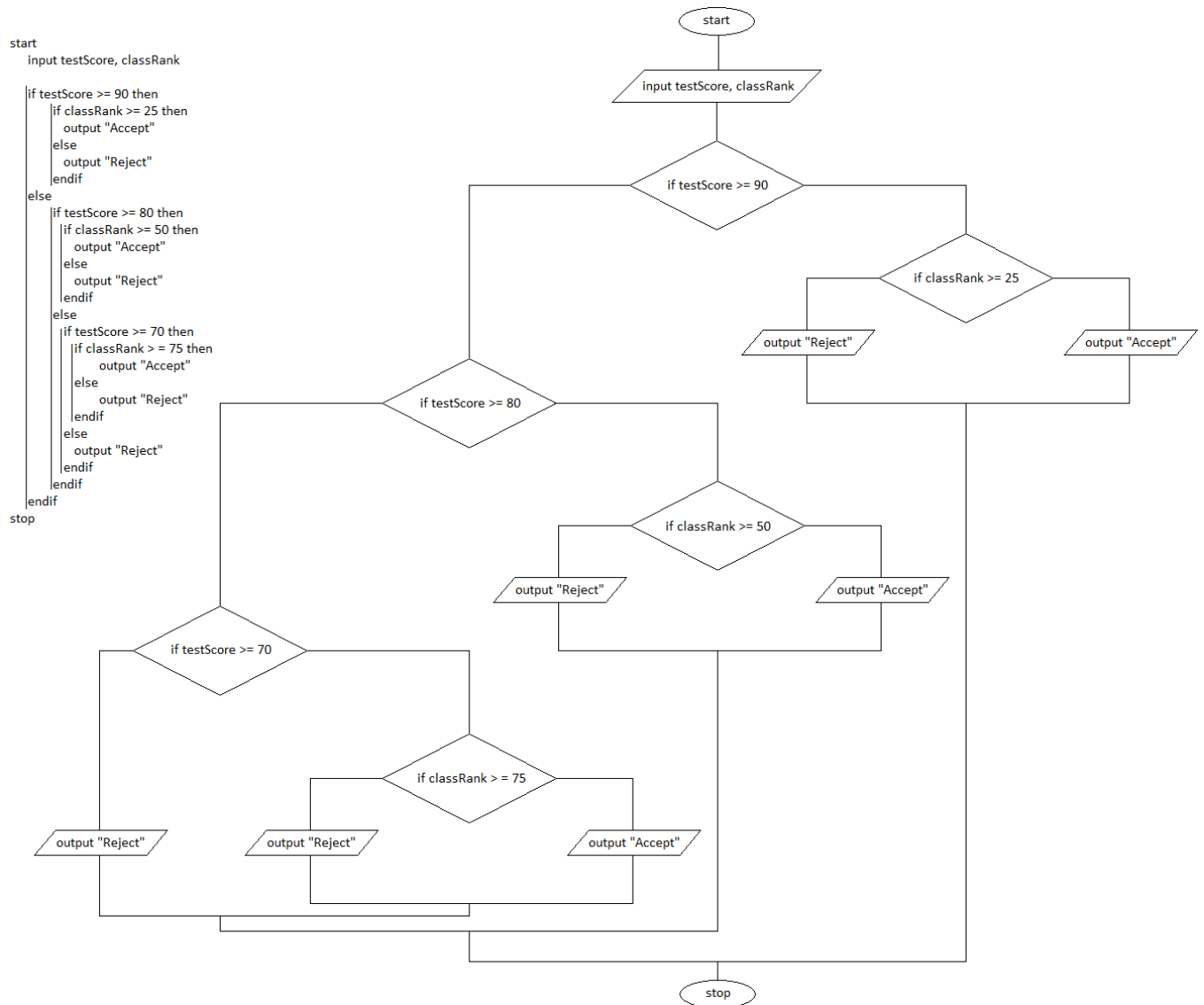
```
"C:\Users\Nii-san\Desktop\prog fund 1\Chapter 3\numberDoubling.exe"
Enter number to double or 0 to end: 33

33 doubled is 66

Enter number to double or 0 to end: 22

22 doubled is 44

Enter number to double or 0 to end: 11

11 doubled is 22

Enter number to double or 0 to end: 0


Code by Jacob Smetana

Process returned 0 (0x0)    execution time : 8.845 s
Press any key to continue.
```

2. Lab 3-1 Flowchart

```
start
    input testScore, classRank

    if testScore >= 90 then
        if classRank >= 25 then
            output "Accept"
        else
            output "Reject"
        endif
    else
        if testScore >= 80 then
            if classRank >= 50 then
                output "Accept"
            else
                output "Reject"
            endif
        else
            if testScore >= 70 then
                if classRank > = 75 then
                    output "Accept"
                else
                    output "Reject"
                endif
            else
                output "Reject"
            endif
        endif
    endif
stop
```

2. Lab 3-1 Program

```cpp
#include <iostream>
using namespace std;
int main()
{
    int testScore;
    int classRank;

    cout << "Enter student's test score: ";
    cin >> testScore;
    cout << "Enter student's class rank: ";
    cin >> classRank;
    cout << endl;

    if(testScore >= 90)
    {
        if(classRank >= 25)
        {
            cout << "Accept" << endl;
        }
        else
        cout << "Reject" << endl;
    }
    else
    {
        if(testScore >= 80)
        {
            if(classRank >= 50)
            cout << "Accept" << endl;
        else
            cout << "Reject" << endl;
        }
        else
        {
            if(testScore >= 70)
            {
                if(classRank >=75)
                    cout << "Accept" << endl;
                else
                    cout << "Reject" << endl;
            }
            else
                cout << "Reject" << endl;
        }
    }
    cout << endl << endl;
    cout << "Code by Jacob Smetana" << endl;

    return 0;
}
```

```
"C:\Users\Nii-san\Desktop\prog fund 1\Chapter 3\Lab 3-1.exe"
Enter student's test score: 87
Enter student's class rank: 60

Accept

Code by Jacob Smetana

Process returned 0 (0x0)    execution time : 4.437 s
Press any key to continue.
```

```
"C:\Users\Nii-san\Desktop\prog fund 1\Chapter 3\Lab 3-1.exe"
Enter student's test score: 60
Enter student's class rank: 87

Reject

Code by Jacob Smetana

Process returned 0 (0x0)    execution time : 4.246 s
Press any key to continue.
```

3. Payroll Report program

```cpp
#include <iostream>
#include <string>
using namespace std;
int main()
{
    string name;
    double gross, deduct, net;
    const double RATE = 0.25;
    const string QUIT = "XXX";
    const string REPORT_HEADING = "Payroll Report ";
    const string END_LINE = "***End of report ";
    // housekeeping() function
    cout << REPORT_HEADING << endl;
    cout << "Enter employee's name: ";
    cin >> name;

    while (name != QUIT)
    {
        // detailLoop() function
        cout << "Enter employee's gross pay: ";
        cin >> gross;
        cout << endl;
        deduct = gross * RATE;
        net = gross - deduct;
        cout << "Name: " << name << endl;
        cout << "Gross Pay: " << gross << endl;
        cout << "Deductions: " << deduct << endl;
        cout << "Net Pay: " << net << endl << endl;
        cout << "Enter employee's name: ";
        cin >> name;
    }
    // endOfJob() function
    cout << endl << END_LINE << endl << endl;

    cout << endl << "Code by Jacob Smetana" << endl;
    return 0;
}
```

```
"C:\Users\Nii-san\Desktop\prog fund 1\Chapter 3\Smith Labs\payrollReport.exe"

Payroll Report
Enter employee's name: William
Enter employee's gross pay: 1500

Name: William
Gross Pay: 1500
Deductions: 375
Net Pay: 1125

Enter employee's name: XXX

***End of report


Code by Jacob Smetana

Process returned 0 (0x0)   execution time : 36.869 s
Press any key to continue.
```

4. Lab 3-2 Flowchart and Pseudocode

```
start
   Declarations
      num year
      num month
      num day
      const num MIN_YEAR = 0
      const num MIN_MONTH = 1, MAX_MONTH = 12
      const num MIN_DAY = 1, MAX_DAY = 31
      bool validDate = true

   input month
   input day
   input year

   if year <= MIN_YEAR then
      validDate = false
   else
      if month < MIN_MONTH || month > MAX_MONTH then
         validDate = false
      else
         if day < MIN_DAY || day > MAX_DAY then
            validDate = false
         endif
      endif
   endif

   if validDate == true then
      output month/day/year "is valid"
   else
      output month/day/year "is invalid"
   endif
stop
```
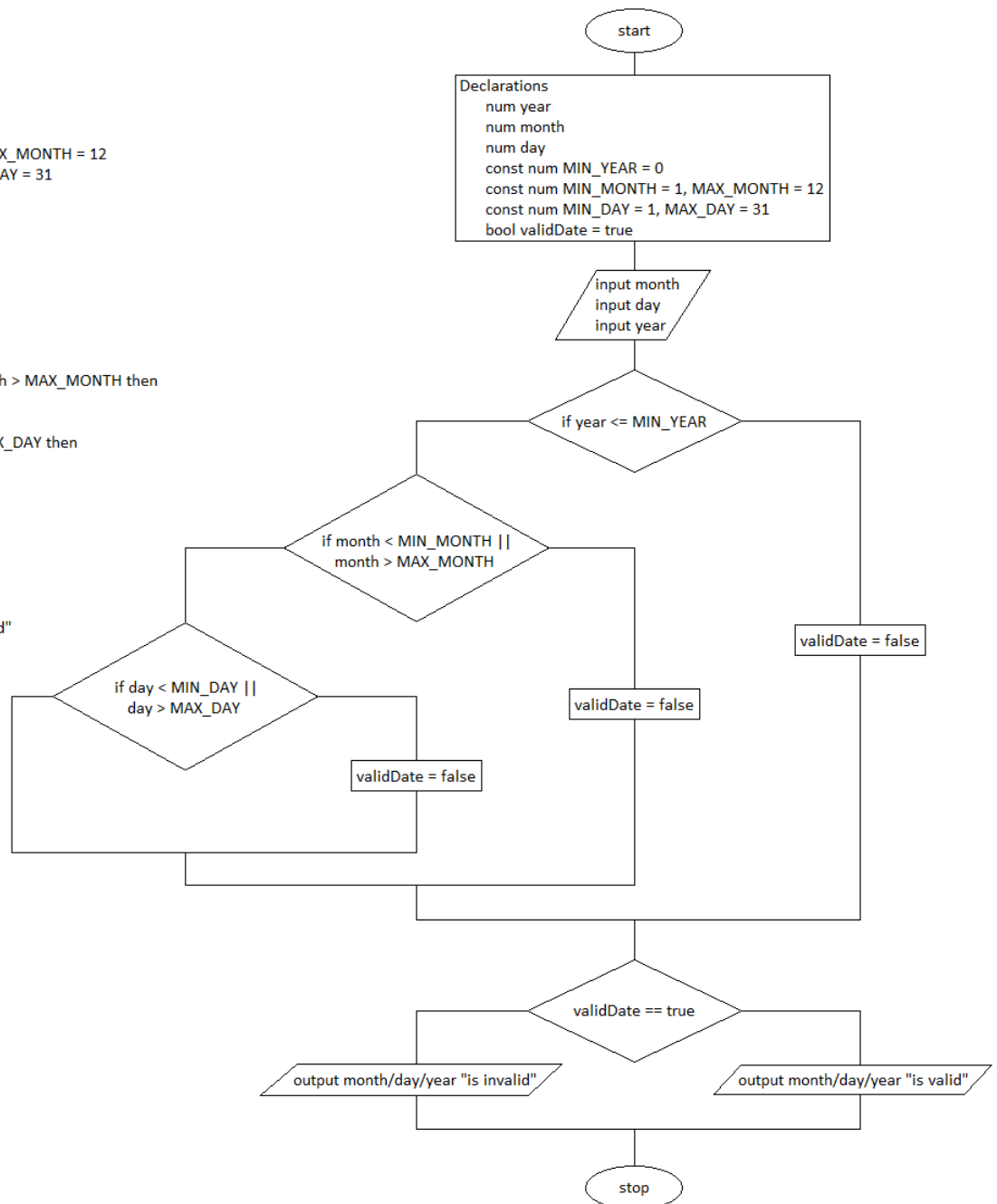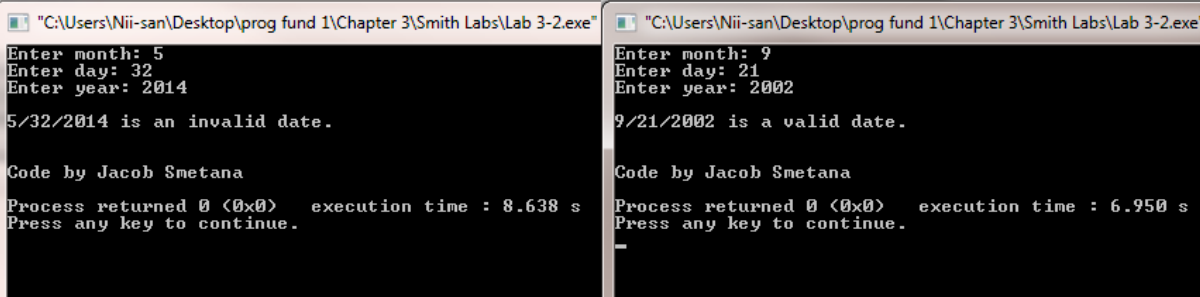
4. Lab 3-2 Program

```cpp
#include <iostream>
bool validateDate(int, int, int);
using namespace std;
int main()
{
    int year;
    int month;
    int day;
    const int MIN_YEAR = 0, MIN_MONTH = 1, MAX_MONTH = 12, MIN_DAY = 1, MAX_DAY = 31;
    bool validDate = true;

    cout << "Enter month: ";
    cin >> month;
    cout << "Enter day: ";
    cin >> day;
    cout << "Enter year: ";
    cin >> year;
    cout << endl;

    // Check to be sure date is valid
    if(year <= MIN_YEAR)  // invalid year
        validDate = false;
    else if (month < MIN_MONTH || month > MAX_MONTH)  // invalid month
        validDate = false;
    else if (day < MIN_DAY || day > MAX_DAY) // invalid day
        validDate = false;

    // test to see if date is valid and output date and whether it is valid or not
    if(validDate == true)
    {
        cout << month << "/" << day << "/" << year << " is a valid date." << endl;
    }
    else
    {
        cout << month << "/" << day << "/" << year << " is an invalid date." << endl;
    }

    cout << endl << endl;
    cout << "Code by Jacob Smetana" << endl;
    return 0;
}
```

```
"C:\Users\Nii-san\Desktop\prog fund 1\Chapter 3\Smith Labs\Lab 3-2.exe"
Enter month: 5
Enter day: 32
Enter year: 2014

5/32/2014 is an invalid date.


Code by Jacob Smetana

Process returned 0 (0x0)   execution time : 8.638 s
Press any key to continue.
```

```
"C:\Users\Nii-san\Desktop\prog fund 1\Chapter 3\Smith Labs\Lab 3-2.exe"
Enter month: 9
Enter day: 21
Enter year: 2002

9/21/2002 is a valid date.


Code by Jacob Smetana

Process returned 0 (0x0)   execution time : 6.950 s
Press any key to continue.
```