MA144: Problem Solving and Computer Programming

Lecture-19

Date program (using functions)

Date problem

Boolean Variable

```
#include <iostream>
using namespace std;
int main()
{ bool a, b=1, c=0, d=false;

  a=true;
  cout<<a<<" "<<b<<" "<<c<<" "<<d<<endl;

  a=-5;
  cout<<a;
  return 0;
}
```

```
1 1 0 0
1
```

Given today's date, find tomorrow's and yesterday's date.

Date is taken as three integers d, m and y.

```
#include <iostream>
using namespace std;
bool valid_date(int,int,int);
void yesterday_date(int,int,int);
void tomorrow_date(int,int,int);
int main()
{
    int d, m, y;    // used to store today's date
    bool valid;
    cout << "Enter today\'s date: ";
    cin >> d >> m >> y; // read today's date
    valid=valid_date(d,m,y);
    if(valid)
     { cout << "Todays date is " << d << "-" << m << "-" << y << endl;
       yesterday_date(d,m,y);
       tomorrow_date(d,m,y);
      }
    else cout<<"date is invalid";
    return 0;
}
```

```
bool valid_date(int d,int m,int y)//begins valid date function definition
{ bool leap, vdate;
  leap = ((y % 4 == 0 && y%100 != 0)|| y % 400 == 0);
  if ( y > 0 && y <= 2023 && m >= 1 && m <= 12)
    {
        if(d >= 1 && d <= 31 &&
            (m==1|| m==3 || m == 5 || m == 7 || m == 8 || m == 10 || m == 12) )
            vdate = true;
        else if( d >= 1 && d <= 30 && (m ==  4 || m  ==  6 || m == 9 || m == 11) )
            vdate = true;
        else if(d >= 1 && d <= 28 && m == 2 && !leap)
            vdate = true;
        else if(d >= 1 && d <= 29 && m == 2 && leap)
            vdate = true;
        else vdate = false;
    }
    else vdate = false;

    return vdate;
}// ends here valid date function definition
```

```
void tomorrow_date(int d,int m,int y)//begins tomorrow's date function definition
{ int td, tm, ty;  // used to store tomorrow's date
   ty=y; tm=m;
  bool leap = ((y % 4 == 0 && y%100 != 0)|| y % 400 == 0);
  if(d==31 && (m == 1 || m == 3 || m == 5 || m == 7|| m == 8 || m == 10 || m == 12))
    {   td = 1;
        if(m == 12)
         {  tm = 1;  ty = y + 1;
          }
        else tm = m + 1;
     }
  else if(d == 30 && (m == 4 || m == 6 || m == 9 || m == 11) )
    {  td = 1; tm = m + 1;
     }
  else if( (d == 28 && !leap) || ( d == 29 && leap))
    { td = 1; tm = m + 1;
    }
  else  // other cases
    { td = d + 1;
      tm = m;
    }
  cout << "Tomorrow\'s date is " << td << "-" << tm << "-" << ty << endl;
} //ends tomorrow's date function definition
```

```
void yesterday_date(int d,int m,int y) //begins yesterday's date function definition
{ int yd, ym, yy; // used to store yesterday's date
  yy=y; ym=m; bool leap = ((y % 4 == 0 && y%100 != 0)|| y % 400 == 0);
 if (d==1)
  {    if(m == 1 )
       { yd = 31; ym = 12; yy = y-1;
       }
      else
       {   ym = m - 1;
           if( ym == 4|| ym == 6 || ym == 9 || ym == 11)
             yd = 30; // if the previous month ends with 30
           else if(ym == 2)  // if it is February
            {  if(leap) yd = 29; // if it is leap year
               else  yd = 28;
            }
           else // if previous month is a 31 days month
             yd = 31;
       }
    }
    else // today is not the first day of this month
    { ym = m;  yd = d - 1;
     }
 cout << "Yesterday\'s date is " << yd << "-" << ym << "-" << yy << endl;
}//ends yesterday's date function definition
```

```
Enter today's date: 20 1 2023
Todays date is 20-1-2023
Yesterday's date is 19-1-2023
Tomorrow's date is 21-1-2023
```

```
Enter today's date: 1 8 2022
Todays date is 1-8-2022
Yesterday's date is 31-7-2022
Tomorrow's date is 2-8-2022
```

```
Enter today's date: 31 12 2023
Todays date is 31-12-2023
Yesterday's date is 30-12-2023
Tomorrow's date is 1-1-2024
```

```
Enter today's date: 1 1 2024
date is invalid
--------------------------------
```

```
Enter today's date: 1 13 2022
date is invalid
--------------------------------
```

```
Enter today's date: 28 2 2012
Todays date is 28-2-2012
Yesterday's date is 27-2-2012
Tomorrow's date is 29-2-2012
```

```
Enter today's date: 29 2 2023
date is invalid
--------------------------------
```

```
Enter today's date: 28 2 2013
Todays date is 28-2-2013
Yesterday's date is 27-2-2013
Tomorrow's date is 1-3-2013
```