The purpose of this project is to experience *parsing*, which we take to mean pulling parts out of a string. We begin with parsing external dates, which and build some code which we will use in the next project.

An *external date* is a string of the form MM/DD/YYYY, where MM is a number from 1 to 12 (the month), DD is a number from 1 to 31 (the day of the month), and YYYY is a number between 1000 and 9999 (the year). In the next project, and not in this one, we will deal with the fact that different months have different numbers of days.

Create one directory called P4_Parsing to store the .java files.

Program 1. Type and compile the Tool class as listed below.

```java
import java.util.Scanner;

public class Tool
{
    private static Scanner scanner = new Scanner(System.in);

    public static String prompt(String p)
    {
        String r = "";
        System.out.print(p);
        return scanner.nextLine();
    }

    public static String piece(String s, String p, int n)
    {
        String r = "";
        String[] t = s.split(p);
        if (t.length >= n) r = t[n-1];
        return r;
    }

    public static int toInt(String s)
    {
        int r = 0;
        try
        {
            r = Integer.parseInt(s);
        }
        catch (Exception ex)
        { }
        return r;
    }

    public static String formatDate(int M, int D, int Y)
    {
        return String.format("%02d/%02d/%04d", M, D, Y);
    }

    public static int pullDate(String s, int p) // p=1: Month  p=2: Day  p=3: Year
    {
        return Tool.toInt(Tool.piece(s, "/", p));
    }
}
```

Program 2. Type and compile the `Program` class as listed below.

```
public class Program
{
    public static void main(String[] args)
    {
        test1();
    }

    public static void test1()
    {
        while (true)
        {
            String s = Tool.prompt("Date: ");
            if (s.length() < 1) break;

            int M = Tool.pullDate(s, 1);
            int D = Tool.pullDate(s, 2);
            int Y = Tool.pullDate(s, 3);

            System.out.printf("M: %d  D: %d  Y: %d\n", M, D, Y);
        }
    }
}
```

Compile and run this program.

Program 3. In the `Tool` class, add a method

```
public static boolean checkDate(String externalDate)
```

which checks that the date is valid. To do this, write code which pulls apart the string using `pullDate` and, using the `if` statement, check that the month, day, year all exist and are in the correct ranges:

- month is between 1 and 12

- day is between 1 and 31

- year is between 1000 and 9999

The method returns `true` if the date is valid, and otherwise returns false.
    Add code to the `Program.test1` method to test your `checkDate` method.

Program 4. In the `Tool` class, write a method

```
public static int countMonths(String externalDate1, String externalDate2),
```

which returns the number of months between two dates (disregarding day of month). For example, the number of months between `01/01/1980` and `05/15/1992` is $(1992 - 1980) \cdot 12 + (5 - 1)$.
    Add a method to the `Program` class to test your `countMonths` method.