

Homework 5

Assigned: Wednesday, Jul 2, 2008

Due: 10:59PM, Monday, Jul 7, 2008

Points: 100

[Instruction]

- To add the Header with pledge, follow the instructions in the web page: <http://www.cs.unc.edu/~zlj/comp110/assignments.html>
- There are two parts of this assignment. The first part is writing assignments. The second part is for programming.
- You need to turn in your writing assignments and your program using Blackboard by 10:59PM, Jul 7, 2008. You also need to demonstrate the program to the instructor. There are two timing slots for demonstration:
 - Jul 8, after the class (11:15AM)
 - Jul 8, office hours (1PM-3PM)

[Grading of the Programming Assignments]

- Compile? (20%)
- Runs as expected? (70%) (correct input/output)
- Readability (comments in your programs) (10%)

[20 pts] I. Writing Assignments: Textbook, Chapter 5, Page 299

Ex. 4 (Explain why)

Ex. 8 (Explain why)

Ex. 24.b (Explain why)

Ex. 30.c (Explain why)

II. Programming Assignments

[30 pts] **a to the power of k:** Write a program that takes two integers a and k and calculates a to the power of k : $result = a^k$. For example, if $a = 3$ and $k = 4$, the result of 3^4 is 81.

[50 pts] Write a program to prompt the user input a positive integer N . The program outputs the following pattern with N rows. For example, when the input N is 7, the program outputs 7 rows. As the following figure shows, there is 1 asterisk in the first row, 3 asterisks in the second row and so on. Your program should work for any positive integer less than 40. ($N = 1, 2, 3, \dots$ or 40).

Input: N=7

```
      *
     ***
    *****
   *********
  ***********
 *****
*****
```

Output:

[Extra Credits: 50 pts] **Checksums:** The International Standard Book Number is a 10 digit code that uniquely specifies a book. The rightmost digit is a *checksum* digit which can be uniquely determined from the other 9 digits from the condition that $d_1 + 2d_2 + 3d_3 + \dots + 10d_{10}$ must be a multiple of 11 (here d_i denotes the i th digit from the right). The checksum digit d_{10} can be any value from 0 to 10: the ISBN convention is to use the value X to denote 10. *Example:* the checksum digit corresponding to 020131452 is 5 since is the only value of d_{10} between 0 and 10 for which $d_1 + 2*2 + 3*5 + 4*4 + 5*1 + 6*3 + 7*1 + 8*0 + 9*2 + 10*0$ is a multiple of 11.

- Prompts the user input a 9-digit integer
- Computes the checksum, and prints out the 10-digit ISBN number.
- Test your program on the ISBN-10 of our textbook and any other books you have.

[Extra Credits: 50 pts] **Calendar:** Write a program `Calendar` that prompts the user input two integers for the month (using 1 for January, 2 for February and so forth), and year (0-10000). Your program needs to print out the monthly calendar for the m th month of year y . For example, your output for 2 (February) 2009 should be

```
February 2009
S M Tu W Th F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
```

Hint: Based on the previous exercises “What is the day of the week” and “Leap Year”