



Notes and Announcements

- Reading Material: review Chapters 1-4.
- This assignment is exceptionally due this week on Friday Oct 19 at 8:00pm.
- A reminder that the first exam will take place on Saturday Oct 20, 2011, 9:00-11:00am, in Bliss Hall.
- Attached are the APIs you may need during the exam. A copy of this page will be distributed to you. The exam is closed-book and closed-notes otherwise. No access to any local or internet resources is allowed.
- You may use your own laptop during the exam, but you have to make sure it has enough battery power to last you for the whole exam period.
- We will have a “Programming Clinic” open to all on Friday 2:00-5:00pm in Bliss 209. This is intended to provide additional help and you are encouraged to take advantage of it as needed.

Exercises

1. **Triangle.** Write a program `Triangle.java` that takes one command line parameter `N` and prints out a two dimensional `N`-by-`N` triangular pattern as shown below. (Hint. Think about the pattern's structure).

```
* * * * *
. * * * *
. . * * *
. . . * *
. . . . *
. . . . . *
```

2. **RandomString.** Write a program that takes a positive integer `N` and a string as command line arguments (`N` is assumed to be smaller than the length of the string). The program should pick `N` random characters from the string and construct and print a new string composed of these random characters.

3. **RemoveSpaces.** Write a method `removeSpaces` that accepts a string as argument and returns a string with the white space characters removed from it (the method should not print anything to the console). The signature of the method should be:

```
public static String removeSpaces(String str)
```

Hint: The method should build a string one character at a time using the `+` operator, starting with the empty string `""`.

Use this method to write a program above that takes an integer command line argument `N` followed by `N` strings and prints each of the strings without spaces. Hint: The strings must be quoted on the command line.

4. **Palindromes.** Write a method `isPalindrome` that accepts a string as argument and returns `true` or `false` indicating if the string is a palindrome or not. A palindrome is a string that can be read the same way forward and backward. Your method must handle upper and lower case characters (the string “Madam” is a palindrome). The signature of the method should be:

```
public static boolean isPalindrome(String str)
```

You are not allowed to generate a new string in your implementation of this method. Rather, you should walk through the string to determine if it is a palindrome or not.

Hint: Use the method `Character.toLowerCase()` and/or one or more of the other methods on variables of type `char`; see page 280 of your textbook.

Use this method to write a program `Palindromes` that takes an integer command line argument `N` followed by `N` strings and prints the strings that are palindromes.

Submission Instructions

As usual, submit your commented source code and sample runs in a zip file named `s#_asst4_netid`, where `#` is your section number (between 1 and 9) and `netid` stands for your AUBnet user name.

APIS

```
public class System.out
```

```
void print(String s)           print s
void println(String s)       print s, followed by newline
void println()              print a new line
void printf(String f, ... )  formatted print
```

```
public class Math
```

```
double abs(double a)         absolute value of a
double max(double a, double b) maximum of a and b
double min(double a, double b) minimum of a and b
Note 1: abs(), max(), and min() are defined also for int, long, and float.
double sin(double theta)     sine function
double cos(double theta)     cosine function
double tan(double theta)     tangent function
Note 2: Angles are expressed in radians. Use toDegrees() and toRadians() to convert.
Note 3: Use asin(), acos(), and atan() for inverse functions.
double exp(double a)         exponential ( $e^a$ )
double log(double a)         natural log ( $\log_e a$ , or  $\ln a$ )
double pow(double a, double b) raise a to the bth power ( $a^b$ )
long round(double a)        round to the nearest integer
double random()             random number in [0, 1)
double sqrt(double a)       square root of a
double E                    value of  $e$  (constant)
double PI                   value of  $\pi$  (constant)
```

```
public class String
```

```
String(String s)            create a string with the same value as s
int length()               string length
char charAt(int i)         i th character
String substring(int i, int j) i th through (j-1)st characters
boolean contains(String sub) does string contain sub as a substring?
boolean startsWith(String pre) does string start with pre?
boolean endsWith(String post) does string end with post?
int indexOf(String p)       index of first occurrence of p
int indexOf(String p, int i) index of first occurrence of p after i
String concat(String t)    this string with t appended
int compareTo(String t)    string comparison
String replaceAll(String a, String b) result of changing a as to bs
String[] split(String delim) strings between occurrences of delim
boolean equals(String t)   is this string's value the same as t's?
```