Exam 1 Makeup 10/23/2018

You have until midnight to upload your solutions to this exam to Latte.
You will be asked to write 5 programs and you should upload each one individually to Latte.
The programs should generate exactly the same output as specified in the problem.

You may use any computer resources you want but you are not allowed to speak to anyone about the exam questions. Any evidence of cheating will be reported to the administration and can result in a range of outcomes from getting zero for the exam to being required to leave Brandeis.

Problem 1. BoilingPoint.java

Write a program which calculates the temperature (in degrees F) at which water boils in terms of the altitude (in feet above sealevel). Your program should produce exactly the same output as that shown below.

The formulas for boiling point are below, where "log" is the natural logarithm

```
boiling point = 49.161 * log(pressure) + 44.932


pressure = 29.921 * (1 - 0.0000068753 * altitude)^ 5.2559
```

For example

```
% java BoilingPoint
Enter the altitude (in feet above sea level):
5280
The boiling point is 202.42231211578803
Try another?
yes
Enter the altitude (in feet above sea level):
-500
The boiling point is 212.86118544263695
Try another?
yes
Enter the altitude (in feet above sea level):
25000
The boiling point is 163.25303738840876
Try another?
no
bye
```

Problem 2. Income Tax

Write a program which asks the user for their annual income and returns their marginal tax rate, assuming they are single. You should use this table

Marginal Tax Rate[8]	Single Taxable Income
10%	$0 – $9,525
12%	$9,526 – $38,700
22%	$38,701 – $82,500
24%	$82,501 – $157,500
32%	$157,501 – $200,000
35%	$200,001 – $500,000
37%	$500,001+

For example, your code should produce exactly the same output as the following:

```
% java IncomeTax
Enter your annual income: 205000
You marginal tax rate is: 35%
```

Problem 3. Email parser

Write a program which asks the user for their email address, which you can assume has the form firstname.lastname@domain and your program will print out the first name, last name, and domain.

For example,

```
% java EmailParse
Enter an email address:
tim.hickey@brandeis.edu
first name: tim
last name: hickey
domain: brandeis.edu
%
```

Problem 4. Divisor Sum

Write a program which asks the user for a positive integer n and then find the sum of the divisors of n.

For example, if n=12 then it is divisible by
1,2,3,4,6,12
and so the sum of the divisors in 1+2+3+4+6+12 = 28

If n = 16, then its divisors are 1,2,4,8,16 which sums to 31

The program should produce the following output:

```
java DivisorSum
Enter n: 1024
The sum of the divisors of 1024 is 2047

% java DivisorSum
Enter n: 12
The sum of the divisors of 12 is 28
```

Problem 5. Grading

Write a program which prompts the user to enter grades, ending with a -1, and then calculates the number of passing grades (>=60) and failing grades (<60), which it then reports to the user. Your output should look exactly like the following:

```
% java Grading
Enter grades between 0 and 100
End with a -1
90
80
60
50
40
99
100
-1
Passes: 5
Fails: 2
```