Lab 4  Name:_________________________  Checked:______

Objectives:
Practice writing algorithms and programs with \texttt{while} loops.

Assignment:

\textit{Let's look at the problem of repeating a calculation, for example, the GPA calculation in one of our earlier programs:}  
\url{http://www.csc.villanova.edu/~map/1051/s15/examples/GPA.java}

\textit{We will do this in \textbf{FOUR} ways.}  
For each of these:  
\begin{itemize}
  \item Write the algorithm
  \item Implement and test the corresponding Java program
\end{itemize}

A: Keep getting new inputs and calculating GPAs until user quits program (infinite loop).

Variables:

Algorithm:

\begin{verbatim}
Implement this program as GPA_Infinite.java

Discuss the algorithm with a classmate and demonstrate your program

Classmate’s signature: ____________________________
Classmate’s signature means: “I agree this is a reasonable algorithm and that the program works according to the above description.”
\end{verbatim}
B: Keep calculating GPAs and ask each time whether to keep going.  

Variables:

Algorithm:

Implement this program as GPA_Ask.java

Discuss the algorithm with a classmate and demonstrate your program

Classmate’s signature: __________________________________________
Classmate’s signature means: “I agree this is a reasonable algorithm and that the program works according to the above description.”
C: Keep calculating GPAs until user inputs -1 for the credits (sentinel value)

Variables:

Algorithm:

Implement this program as GPA_Sentinel.java

Discuss the algorithm with a classmate and demonstrate your program

Classmate’s signature: ________________________________

Classmate’s signature means: “I agree this is a reasonable algorithm and that the program works according to the above description.”
D: Calculate GPA for 7 students *(exact count)*.

*Variables:*

*Algorithm:*

*Implement this program as GPA_ExactCount.java*

*Discuss the algorithm with a classmate and demonstrate your program*

*Classmate’s signature: ____________________________*

Classmate’s signature means: “I agree this is a reasonable algorithm and that the program works according to the above description.”
E: Modify one or more of the above algorithms (choose at least one of B, C, or D) and corresponding program to also keep track of and output the maximum GPA computed

*Modifying algorithm for: _____B _____C _____ D (check one)*

*Variables:*

*Algorithm:*

*Implement this program as GPA_Max.java*

*Discuss the algorithm with a classmate and demonstrate your program*

*Classmate’s signature: ________________________________*
Classmate's signature means: “I agree this is a reasonable algorithm and that the program works according to the above description.”
Loop Practice
What gets printed? Trace through these loops by hand. Show output as it will appear or indicate “NO OUTPUT” -- or show some of the output followed by “INFINITE LOOP.”

===================================
int a = 0;
while (a<10)
{
    System.out.println(a);
    a++;
}

===================================
int a = 0;
while (a<10)
    System.out.println(a);
    a++;
// (same as previous, except no braces)

===================================
int a = 0;
while (a<10)
    a++;
    System.out.println(a);

===================================
int a = 1;
while (a<=10)
{
    a++;
    System.out.println(a);
}

===================================
int a = 1;
while (a <= 5)
{
    System.out.println(2*a);
    a++;
}

===================================
int a = 1;
while (a <= 5)
{
    System.out.println(a);
    a += 2;
}

===================================
int a = 10;
while (a<10)
{
    System.out.println(a);
    a++;
}

===================================
int a = 10;
while (a>0)
{
    System.out.println(a);
    a--;
}

===================================
int a = 10;
while (a>0)
    System.out.println(a);
    a = a - 2;

===================================
int a = 10;
while (a>0)
    System.out.println(a);
    a--;

===================================
int a = 10;
while (a>0)
    System.out.println(a);
    a = a - 2;

===================================