CS101: Homework #11

This assignment is due by 04/23.
Homework should be sent to ar238@njit.edu
with a subject line read as: CS101/012 HW#11

5.8 Exercises

5.1 Write the MATLAB statements required to calculate $y(t)$ from the equation

$$y(t) = \begin{cases} 
-3t^2 + 5 & t \geq 0 \\
3t^2 + 5 & t < 0 
\end{cases}$$

for values of $t$ between -9 and 9 in steps of 0.5. Use loop and branches to perform this calculation.

5.3 Write the MATLAB statements required to calculate and print out the squares of all the even integers between 0 and 50. Create a table consisting of each integer and its square, with appropriate labels over each column.

5.7 Exam the following for statements and determine the value of `ires` at the end of each of the loops and also the number of times each loop executes.

(a) `ires=0;`  
   `for index=-10:10`  
   `    ires=ires+1;`  
   `end`

(b) `ires=0;`  
   `for index=10:-2:4`  
   `    if index==6`  
   `        continue;`  
   `    end`  
   `    ires=ires+index;`  
   `end`

(c) `ires=0;`  
   `for index=10:-2:4`  
   `    if index==6`  
   `        break;`  
   `    end`  
   `    ires=ires+index;`  
   `end`

(d) `ires=0;`  
   `for index1=10:-2:4`  
   `    for index2=2:2:index1`  
   `        if index2==6`  
   `            break;`  
   `        end`  
   `    ires=ires+index2;`
5.8 Exam the following while loop and determine the value of $i_{res}$ at the end of each of the loops and also the number of times each loop executes.

(a) $i_{res}=1$;
while $\text{mod}(i_{res},10)\neq 0$
   $i_{res}=i_{res}+1$;
end

(b) $i_{res}=2$;
while $i_{res}<=200$
   $i_{res}=i_{res}^2$;
end

(c) $i_{res}=2$;
while $i_{res}>200$
   $i_{res}=i_{res}^2$;
end

5.9 What is contained in array $arr1$ after each of the following sets of statements is executed?

(a) $arr1=[1 \ 2 \ 3 \ 4; \ 5 \ 6 \ 7 \ 8; \ 9 \ 10 \ 11 \ 12]$;
   $mask=\text{mod}(arr1,2)==0$;
   $arr1(mask)=-arr1(mask)$;

(b) $arr1=[1 \ 2 \ 3 \ 4; \ 5 \ 6 \ 7 \ 8; \ 9 \ 10 \ 11 \ 12]$;
   $arr2=arr1<=5$;
   $arr1(arr2)=0$;
   $arr1(~arr2)=arr1(~arr2).^2$;

5.23 Fibonacci Numbers. The $n$th Fibonacci number is defined by the following recursive equations:

\[
\begin{align*}
  f(1) & = 1 \\
  f(2) & = 2 \\
  f(n) & = f(n-1) + f(n-2)
\end{align*}
\]

Therefore $f(3)=f(2)+f(1)=2+1=3$, and so forth for higher numbers. Write an M-file to calculate and write out the $n$th Fibonacci number for $n>2$, where $n$ is input by the user. Use a while loop to perform the calculation.