C-Quiz for Physics 4051, November 9, 2007
15 Minutes
12.5 points - closed book – no calculators allowed - show your work

1) (12.5 Points)
Write a complete console* ANSI-C program that calls the function \textit{Convert}(x, u), specified below.

a) Your complete ANSI-C program must call your \textit{Convert}(x, u), function (see part b) for details. Declare the local variables $x$ and $u$ and assign some arbitrary numerical values to them. You must assign the value returned by the function to a suitable (local) variable. (5 pts)

b) Write your own C-function called \textit{Convert}(x, u) which, depending on the variable $u$, converts an angle from degrees to radians or vice versa. Specifically:
   - if $u > 0$, the function converts $x$ from degrees to radians and returns the result;
   - if $u < 0$, the function converts $x$ from radians to degrees and returns the result;
   - if $u = 0$, the function does not convert anything and simply returns $x$.

You may find the following equations useful:
\begin{align*}
\text{radians} &= \pi \text{ degrees} / 180 \\
\text{degrees} &= 180 \text{ radians} / \pi
\end{align*}

The argument, $x$, is of type \texttt{double} while $u$, is of type \texttt{int}.

Write the entire function, including function prototype, header, body and return statement using the appropriate variable types as specified above. (7.5 pts)

You are not allowed to use global variables in your program or function though you may use as many or as few additional local variables as you consider necessary.

Final Note: in your program (or function) do \textbf{not} include any input or output statements such as \textit{scanf} or \textit{printf} or any include files. You will be graded on program logic and syntax mistakes.

Console* means you must \textbf{not} include a LabWindows Graphical User Interface (GUI) or any (callback) functions to the GUI.
Solution:

```c
#include <ansi_c.h>   //not required in quiz
double Convert( double x, int u);

main()
{
    double x = 3.141459;
    int u = 0;
    double result;
    char a;    //not required
    result = Convert(x, u);
    printf("%lf\n", result); //not required
    scanf("%c", &a); //not required
}

double Convert( double x, int u)
{
    double k = 4.0*atan(1.0)/ 180.0;

    if(u > 0)
        x = k*x;
    else if( u < 0)
        x = x/k;
    return x;
}
```