ECOR 1606 Winter 2014 - Assignment #2

Note: Program comments are required for full marks on every program you write! You must also include your name and student number in the comments in the first line of every program. If you use a sample solution as your starting point in any question, please indicate this in your comments.

Question 1

Write a C-- program (to be called "*a21.cmm*") that reads in a value (*n*) and that calculates:

$$\pi = 4\left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} \ldots \pm \frac{1}{2n+1}\right)$$

The value entered for *n* must be a positive integer. If it is not, your program should just output an error message (and not do anything else). In C-- function *isInt* can be used to determine whether or not a value is an integer (as shown below)

```
if (isInt(k)) {
        // if we get here k is an integer
        ...
} // endif
```

Apart from *isInt*, you may NOT make use of any other functions.

Hint: Use your solution (or the sample solution) from assignment #1 question #4 to help you. **If you choose to start from a sample solution, please state this in your comments.**

Submit "*a21.cmm*" as Assignment 2; A#2 – Question 1.

Question 2

Imagine that we want to determine if a proposed house plan will fit onto a given housing lot and remain in compliance with the local building code. All lots and houses that we will consider are rectangular or square. For a house to meet the building code it must:

Must allow for a minimum clearance of 2 metres between the house and lot on all sides of the house.

Occupy at least 25% of the lot area

Occupy no more than 40% of the lot area

We know the size of the lot and size of the house. For each house, there are four possibilities. The house can fit, it may occupy too much of the lot, it may occupy too little of the lot or it may not allow for the appropriate lot line clearance.

Suppose, for example, that the lot is 20 x 50 m (or 50 x 20 m)

If a house is 16 x 18 m (or 18 x 16 m), it fits the lot.

If a house is 17 x 30 m (or 30 x 17 m), it does not allow for the lot line clearance

If a house is 15 x 14 m (or 14 x 15 m), it is too small.

If a house is 16 x 40 m (or 16 x 40 m), it is too large.

You are to create a C-- program ("*a22.cmm*") that reads in the size of the lot and that then repeatedly reads in house sizes until 0 0 is entered. For each house size entered, your program should output a message indicating which of the four possibilities applies.

A sample executable has been supplied. Running it should give you an excellent idea of what is required. Note that the lot and house dimensions may be entered in either order. There is no requirement that the smaller dimension always be entered first (or last). This makes the program somewhat more interesting.

Some error checking is required. If the lot length and lot width entered are not both greater than zero, your program should output an error message and have the user try again (and so on until valid dimensions are obtained). Bad house dimensions should also be rejected. Unless the length and width are both zero (our special "sentinel" combination), both the length and width must be greater than zero.

When 0 0 is entered you program should end.

Hint: Things would be much easier if the smaller dimension were always entered first (or last). Why not make this so by interchanging any dimensions that are entered the "wrong way" around?

Note: If a house does not fit the lot clearance and also does not meet either of the size requirements, it should only generate the lot line clearance message as in the sample program.

Submit "*a22.cmm*" as Assignment 2; A#2 – Question 2.