Problem Set 05 - Special Member Functions

Complete each task below. Remember to include all header files in the accompanying cpp file and test the functions.

Tasks:

1. Create a header file named `"Point.h"` and define the class *Point* within the namespace *PS5*. The class must contain

   - ☐ a public int field named *x*.
   - ☐ a public int field named *y*.
   - ☐ a public default constructor that assigns 0 to both fields.
   - ☐ a public copy constructor.
   - ☐ a public assignment operator.
   - ☐ a public empty destructor.

   Afterward, within the accompanying cpp file, define a string function named `ToString()` that takes a *Point* reference parameter. It returns a string in the format

   `(`*x*`,`*y*`)`

   where *x* and *y* are the values of the *x* and *y* fields of the parameter respectively.

2. Create a header file named `"Item.h"` and define the class *Item* within the namespace *PS5*. The class must contain

   - ☐ a public string field named *id*.
   - ☐ a public *Point* pointer field named *position*.
   - ☐ a public default constructor that assigns an empty string to *id* and allocates a default *Point* to *position*.
   - ☐ a public copy constructor that performs a deep copy.
   - ☐ a public assignment operator that performs a deep copy.
   - ☐ a public destructor that deallocates *position*.

   Afterward, within the accompanying cpp file, define a string function named `ToString()` that takes a *Item* reference parameter. It returns a string in the format

   x `:=` *y*

   where *x* and *y* are the values of the *id* and *position* fields of the parameter respectively.

3. Create a header file named `"Interval.h"` and define the class *Interval* within the namespace *PS5*. The class must contain

   - ☐ a public double array field named *endpoints* with a size of 2.
   - ☐ a public bool array field named *included* with a size of 2.
   - ☐ a public default constructor that assigns {0,10} to *endpoints* and {true,true} to *included*.
   - ☐ a public copy constructor.
   - ☐ a public assignment operator.
   - ☐ a public empty destructor.

   Afterward, within the accompanying cpp file, define a string function named `ToString()` that takes a *Interval* reference parameter. It returns a string in the format

   w *x*`,` *y* *z*

   where *w* is `[` if *included*[0] field of the parameter is true, or otherwise *w* is `(`, *x* and *y* are the values of the elements of *endpoints* field of the parameter in order, and *z* is `]` if *included*[1] field of the parameter is true, or otherwise, *z* is `)`.