Homework

17

What's the Point

For this assignment define your own user-defined structure type, named `Point` that has two `int` data members, `x` and `y`.

Then, write the functions:

- `read()` and `write()` which perform I/O on `Point` objects. `write()` displays the `Point` in the form `(x, y)` while `read()` reads a `Point` in the form `x, y` where the space is optional, but the comma is not.
- `double distanceBetween(const Point& a, const Point& b)` computes the distance from `a` to `b`.
- `Point midpoint(const Point& a, const Point& b)` computes the point that is halfway between `a` and `b`.

Implementation Notes

The header file contains prototypes for each function, **not** the ***`Point`*** or ***`Triangle`***.

- Define the `Point` type as a **structure type** in the header file where noted. Make sure **they are in the order** `x` and then `y`.

Type `make`. You should have no compiler errors, only linker errors.

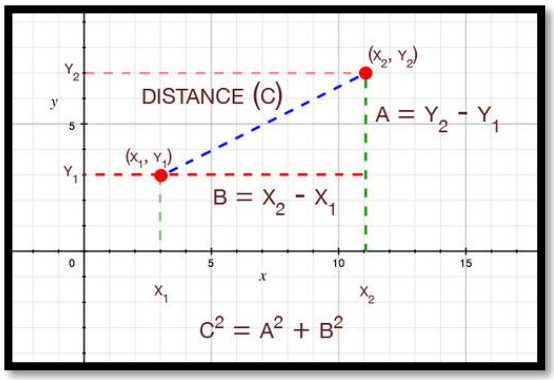
Writing Functions

Add the implementations for the functions in the `.cpp` file.

- The `write()` function should print `Point` objects as `(x, y)`.
- With `read()`, input is entered as `x, y` where `x` and `y` are `int`, separated by a comma and optional spaces. `get()` must **read and discard** the `char` value separating the two `int` values. If you use formatted input (`>>`) then the spaces will not be a problem. Don't worry about exceptions.

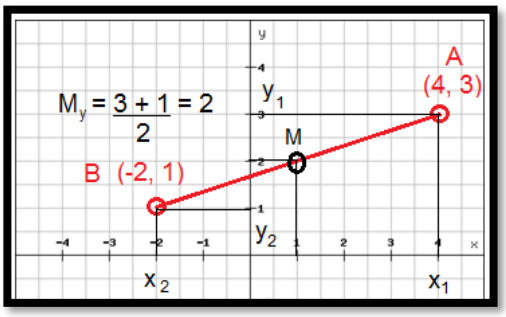
The distanceBetween Function

To find the distance, use the **Pythagorean** formula for finding the hypotenuse. Since you'll need the `sqrt()` function to do that, you have to **be sure to include** `<cmath>`.



The midpoint Function

The **midpoint** between the two `Points` `a` and `b`, is the `Point` on the distance line, equi-distant from `a` and `b` as shown here. The formula to calculate the midpoint is simply the sum of `a.x` and `b.x` divided by `2`, plus the sum of `a.y` and `b.y` divided by `2`.



Use `make test` and `make submit` to turn in the assignment. Ask questions on the discussion board if you get stuck, or stop by my office hour.