

Assignment 1

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Compared to Design 1, both Design 2 and Design 3 are able to read specific coordinates faster. For example, when using Design 2, it takes very little time to run `getRho()` multiple times. Compared to Design 1, Designs 2 and 3 use fewer variables and less storage than Design 1. However, it is necessary to compute each time another coordinate is read, which makes the program more time consuming. For Design 5, it is possible to call `PointCP2` and `PointCP3` more flexibly in terms of use.

Design		Execution Time	Maximum Time	Minimum Time
Design 2: Store polar coordinates only	cartesian coordinates	1511	1736	1321
Design 2: Store polar coordinates only	polar coordinates	4	7	2
Design 3:only Store cartesian coordinates	cartesian coordinates	3	5	2
Design 3:only Store cartesian coordinates	polar coordinates	5635	5986	5212
Design 5: Abstract class with designs 2 and 3 as subclasses	cartesian coordinates	4	7	2
Design 5: Abstract class with designs 2 and 3 as subclasses	polar coordinates	3	5	2

Test their runtimes by calling `PointCP2`, `PointCP3` to do `getX()`, `getY()`, `getRho()`, `getTheta()`. For design 5, since it can call `cp2` and `cp3`, the corresponding programs are used when the corresponding data needs to be obtained. By comparison, it can be concluded that simply returning is the quickest way to run, and if a quick method is needed, it needs to be used according to the specific class.