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SEG2105 Assignment 1

Textbook Questions

E26

	Advantages	**Disadvantages**
Design 1	● Simplifies data storage ● Reduces memory usage	● Requires an additional flag to indicate which type is stored.
Design 2	● A simple implementation for polar computations	● More room for errors during computations
Design 3	● Efficient for storing and retrieving cartesian coordinates	● Complicated to compute polar coordinates
Design 4	● Provides access to both types, making them easier to retrieve	● Higher memory usage
Design 5	● Both modules are incorporated into the program, which is more efficient	● Increased memory and complexity of code

E30

For Part 2a below, we created an array of size 10,000,000, and below are the construction run times in milliseconds for ArrayList, Vector, and Array

	Trial 1	**Trial 2**	**Trial 3**	**Trial 4**	**Trial 5**	**Trial 6**	**Trial 7**
ArrayList	1536	1519	3896	3123	2967	3661	2947
Vector	977	1028	2104	2477	1691	2103	1347
Array	250	322	566	806	416	611	347

Average Runtime for each Array (ArrayList, Vector & Array):

ArrayList = 2807 ms
Vector = 1675 ms
Array = 474 ms

Part 2b: Below are the iteration run times in milliseconds for ArrayList, Vector, and Array

	Trial 1	**Trial 2**	**Trial 3**	**Trial 4**	**Trial 5**	**Trial 6**	**Trial 7**
ArrayList	46	39	68	56	89	41	136
Vector	373	400	842	596	706	566	1447
Array	13	26	46	23	24	17	32

Average Runtime for each Array (ArrayList, Vector & Array):

ArrayList = 68 ms
Vector = 704 ms
Array = 26 ms

Conclusion

In conclusion, the array with the fastest run time Array for both parts (construction and iteration times). It’s important to consider the specific requirements of your application when choosing between Array