Convex Hull Challenge for VISR-VR

In this challenge I was tasked with writing a program capable of solving a convex hull problem consisting of 16 points. I chose to solve it using Rust[1] as that is the language I am currently focusing on trying to learn more thoroughly and saw this as an opportunity to further my ability in an organic way.

In my preliminary research for this project I learned that there are several existing algorithms[2] with this purpose. I chose to use one of these algorithms due to the time constraints and exams. Furthering my research I settled on Graham Scan[3] as my algorithm of choice. I made this decision as it seems to be one of the more efficient algorithms; which while this dataset is unnecessary, would be important if this program were to be run against a larger dataset. It is also worth noting that this algorithm can not be used with 3d data.

Another choice I had to make was which sorting algorithm to use when sorting points by polar angle. The way in which I have done this is by no means efficient. To make this more efficient I could have cached the result of angle_with in a lazy way as so it was only called once, and only when the value was required. I would also use a different sorting algorithm.

In this project I have made the decision to not use any third party libraries, with the exception of rand[4] which was used to generate random points. It would not have feasible for me to attempt to implement this myself.

Whilst I am happy with my implementation for the purpose of this challenge, it is clear there are many things I would do differently if I had more time or fewer commitments.

[1] https://www.rust-lang.org/en-US/
[2] http://www.cs.wustl.edu/~pless/506/l3.html
[3] http://www.inf.ed.ac.uk/teaching/courses/ads/Lectures/lec16.pdf
[4] https://crates.io/crates/rand

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