

Sia Sharma

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Code Output:

```
● siasharma@crc-dot1x-nat-10-239-170-178 hw9 % cargo run
  Compiling hw9 v0.1.0 (/Users/siasharma/Desktop/rusthw/hw9/hw9)
  Finished dev [unoptimized + debuginfo] target(s) in 0.55s
  Running `target/debug/hw9`
if x >= -97069
    Predicted label is 1
else
    Predicted label is 0
accuracy: 0.5333333333333333.
○ siasharma@crc-dot1x-nat-10-239-170-178 hw9 %
```

Analysis on solution and complexity:

- This Rust code generates a random dataset with a specified number of points and labels. It iterates over each point as a potential split point and calculates the accuracy of the resulting decision tree. This process involves comparing the predicted labels based on the split to the actual labels in the dataset. The split point that gets the highest accuracy is selected as the optimal point. The program outputs this decision point along with the accuracy.
- With a time complexity of n^2 , where n is the number of points, the program efficiently determines the optimal split point for small datasets. For larger datasets this might become a problem as the comparisons have to increase with more points. Further optimizations could involve exploring more efficient algorithms with a lower complexity. Overall, the code helps with binary classification based on a decision tree model.