Note: Abstracts must be submitted in single spaced format. Line spacing here was adjusted for readability purposes. The following examples of abstract scoring are for illustration purposes only. The edits and comments shown reflect what reviewers may be "thinking" as they score an abstract. Brackets indicate clear delineation of sections (Introduction, Methods, Results, Discussion/Conclusion). Students will not receive such individual markups of their scored abstracts.

Improving De-cloning Algorithms for Jefferson Lab's Hall A BigBite Spectrometer

In particle physics experiments, the main method of determining the track of detected particles is through algorithmic computer analysis. As part of these algorithms' function, it may be necessary to perform de-cloning to collate multiple cloned tracks use parens here caused by a particle into a single entity, while also eliminating spurious detections. Generally, de-cloning can be handled by clustering algorithms, but good clustering algorithms are difficult to implement because both an acceptable run time and result stability are often at odds. The goal of this research was to overcome these limitations by developing an algorithm with a fast run time, but with a consistent and high tracking efficiency; and study it for use in multi-wire drift chambers tracking linear particle trajectories. The algorithm developed used a simple two-dimensional adjacency based on a track's front and back intercepts in the detector. A variant in which the adjacencies were dynamically created during the discovery of potential tracks was also evaluated. These were compared to a previously implemented algorithm, which instead used the underlying detector hits to group cloned tracks. The new algorithms are shown to have a linear time complexity with respect to the number of potential tracks, while still reproducing or exceeding the tracking efficiency of the more complex hit-based algorithm. Since the theoretical lower bound for clustering is linear, this approach appears to be near-optimal. Future studies are needed to assure that the results of these approaches are correct, ~~though~~, as data produced from known tracks was not available to compare against. Pending such an investigation, the algorithms compare favorably against the original, and could be considered for use in order to decrease the time needed for analysis of ~~the~~ data.

Introduction	2
Methods	2
Results	2
Conclusion	2
Language + Conventions	0
Total	8