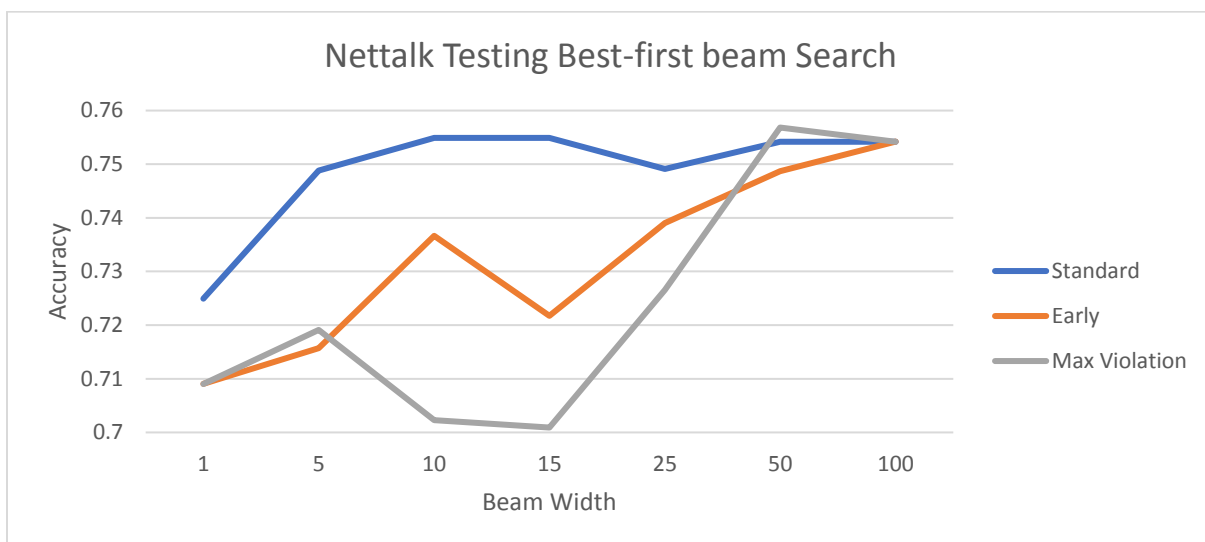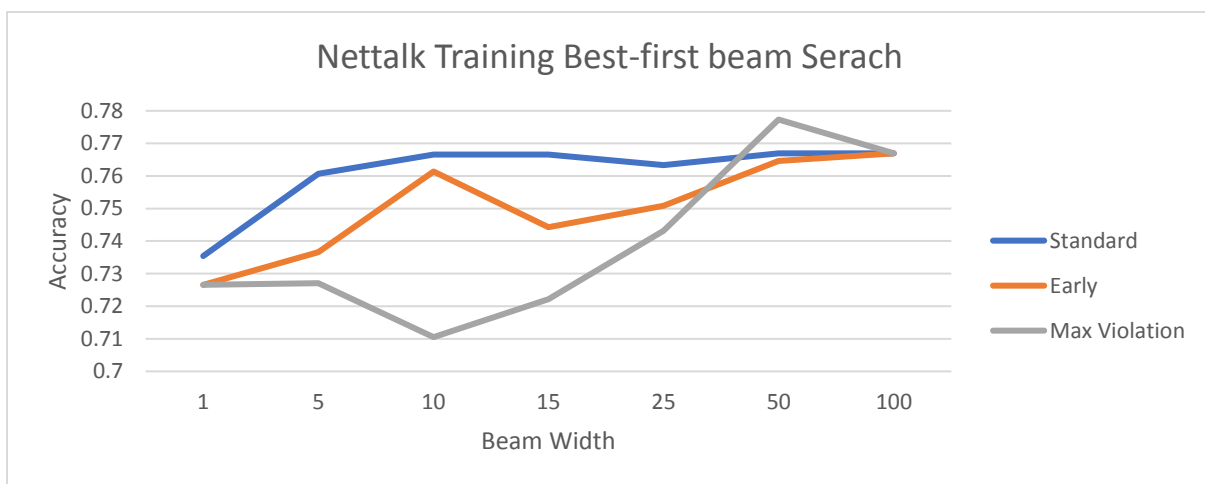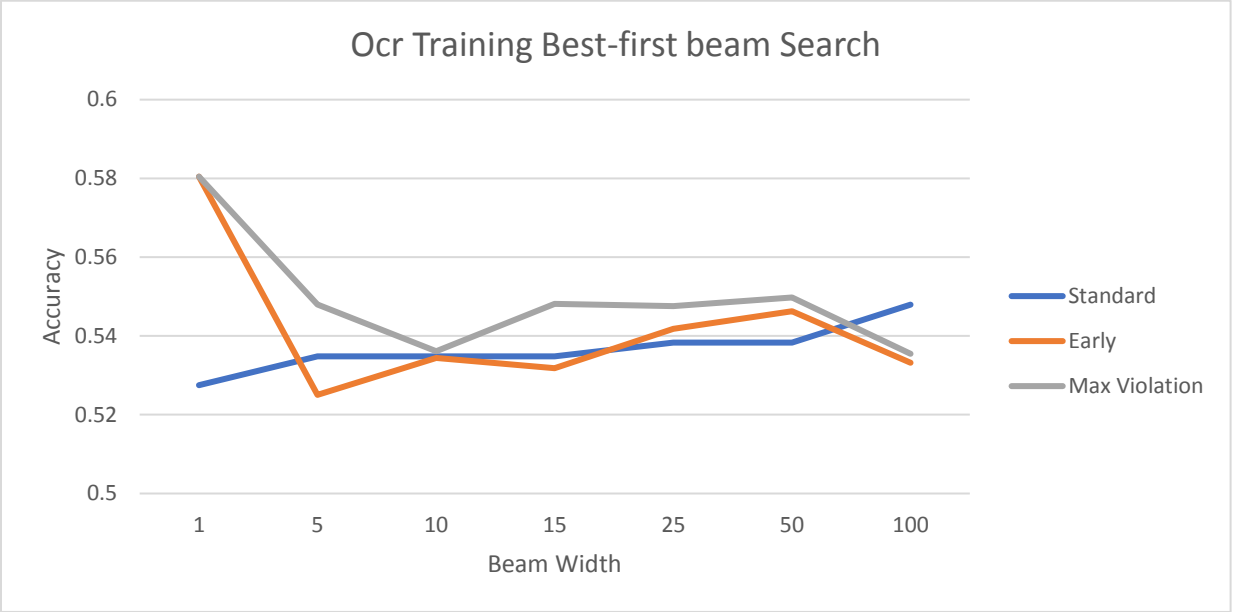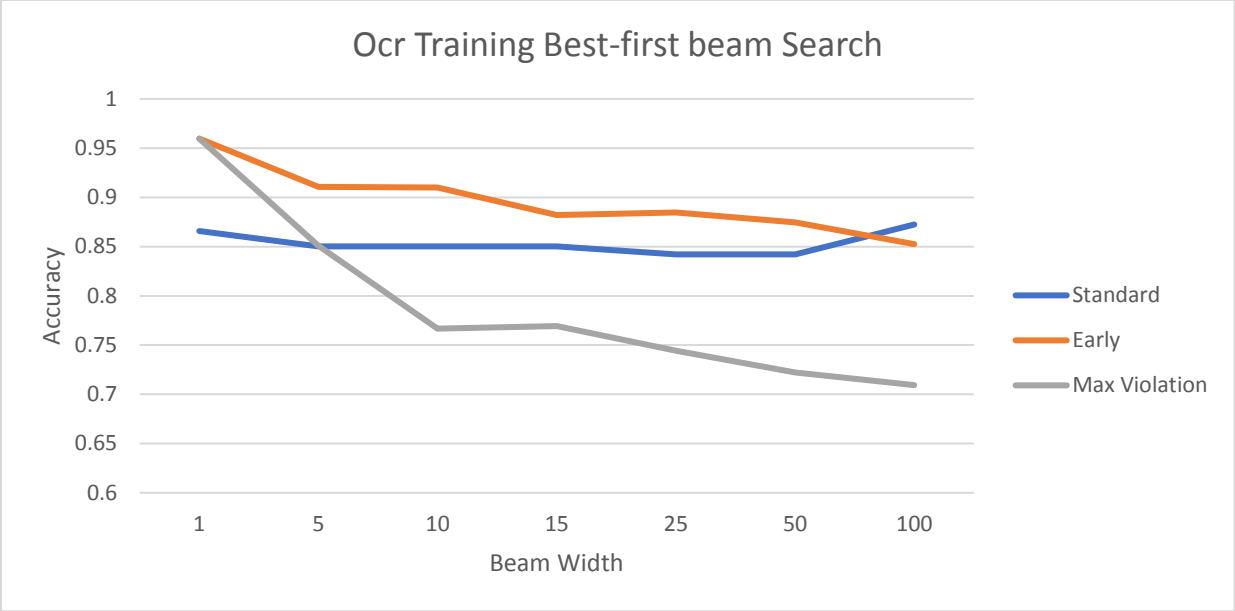**CPT_S 580 HW2**

Yang Zhang

11529139

(a) Implemented in Java

(b) Implemented in Java (will discontinue search when trigger the update condition in both early and max-violation update modes)
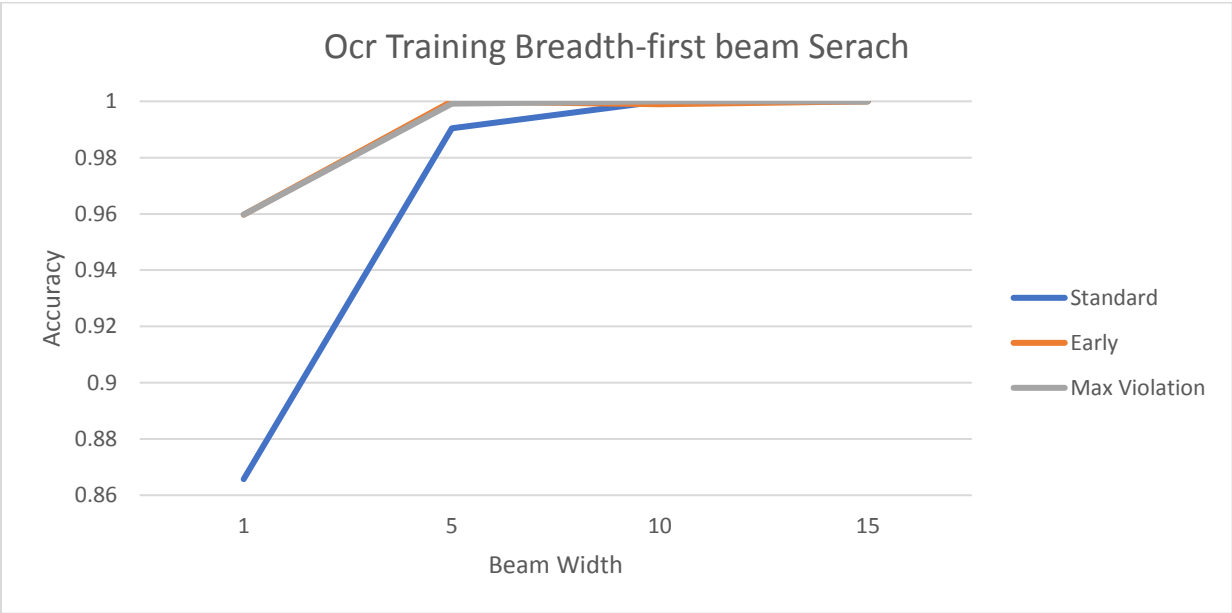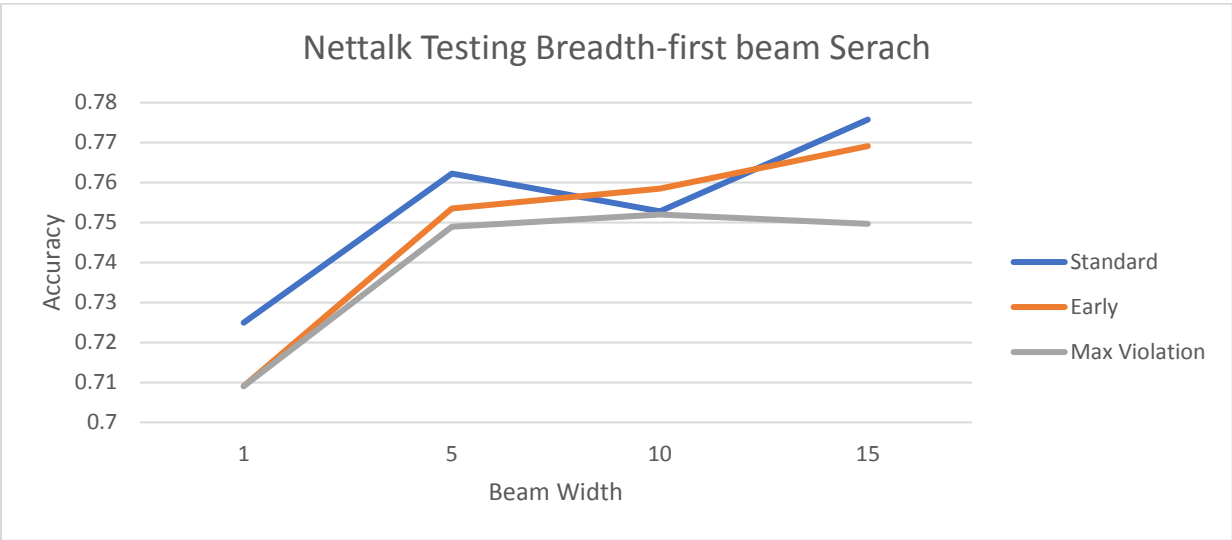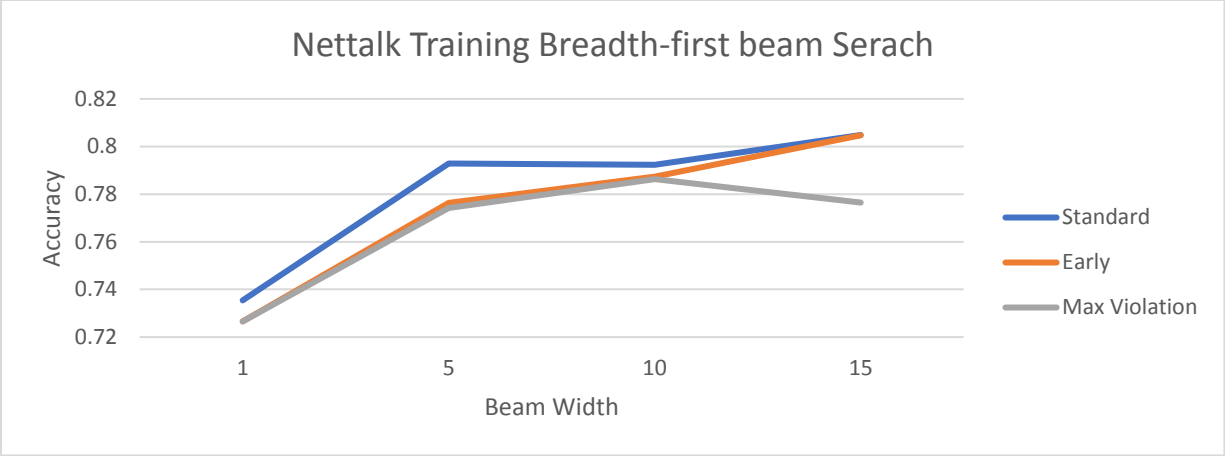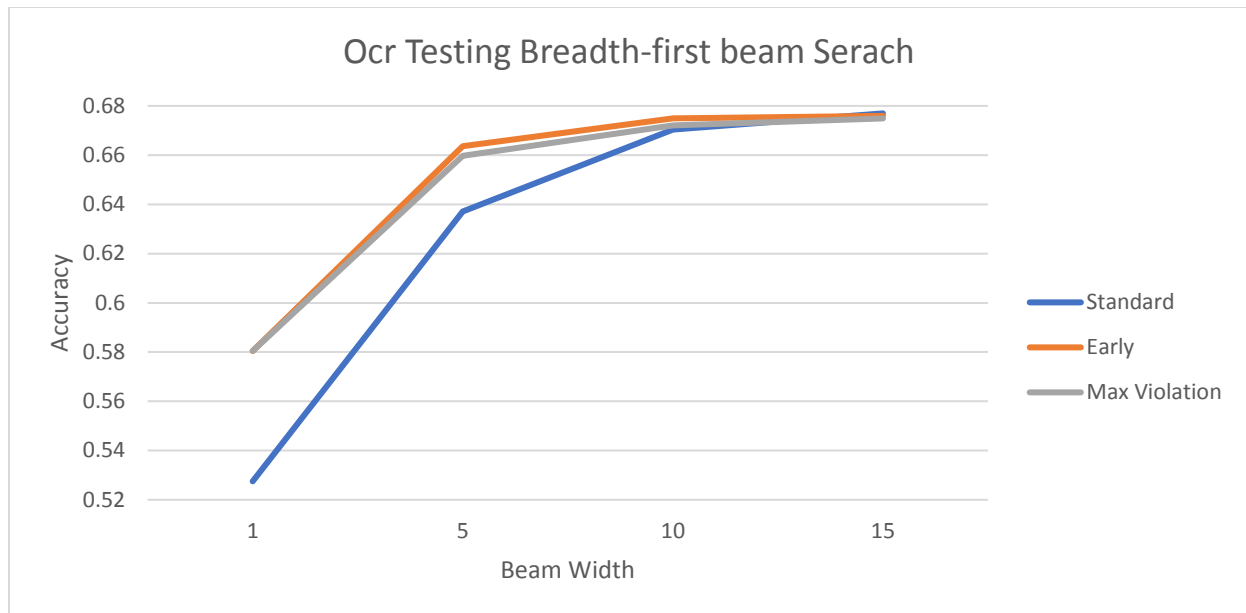
(c) Implemented in Java

(d) Best-first Beam Search

(e) Breadth-first Beam Search

Nettalk Training Breadth-first beam Serach

Nettalk Testing Breadth-first beam Serach

Ocr Training Breadth-first beam Serach

Ocr Testing Breadth-first beam Serach

(e) List your observations about standard update vs. early update vs. max-violation update

In both best-first and breadth-first beam search, the hamming accuracy of all the three kind of update methods will be increased with wider beam width in general. The reason is that with wider beam, the search algorithm could exam more candidates.

For the early update and max violation update modes, If the beam size is 1, both early and max-violation updates behave the same way. The Hamming accuracy is usually higher than standard update. This is because both early and max-violation updates prevent doing wrong search deeper by terminating search immediately when no target node in current beam.

(f) List your observations about best-first beam search vs. breadth-first beam search based training and inference.

If the beam size is 1, both best-first beam search and breadth-first beam search behave the same way. Otherwise, the hamming accuracy of breadth-first beam search is generally higher than best-first beam search. The reason is that with the same beam size, breadth-first beam will generate much more candidates than best-first's, which means breadth-first is more likely to have a correct candidate in its beam.