Project 4 Report

Theory of Computer Game

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1 Method and Improvement

The method I use for this game is monte carlo tree search with root parallelization. Total number of simulation is set to 40000 and every thinking time is limited to 10 seconds in order not to exceed the total thinking time 300 seconds in a game.

Time Management

Use the method in paper Time Management for Monte Carlo Tree Search by Hendrik Baier and Mark H. M. Winands, Member, IEEE. I have used some method mentioned in the paper which is EXP-MOVE with STOP. EXP-MOVE make the agent to spend greater time to search at first then little time at the end. And STOP set the criterion to early stop grow the tree. The termination criterion of STOP is: $\frac{n \cdot timeleft_n}{timespent_n} \cdot p_{earlystop} \leq visits_{best_n} - vists_{secondbest_n}$ The constant $p_{earlystop}$ is set to 0.9. The method I have used in tournament in the bigining, but I found it is bad in the tournament. Since there are a lot of time to search in the begin, but it is not simulation in the best way. Thus there is no time for the end, then the agent would play at random.

Root Parrelization

I used 4 threads to run root parallelization, since I had to use tcglinux machine. I found that if there are 10 20 threads would be better, but my computer is Mac QQ.

RAVE

I also used RAVE in the tournament, but I can't determine it is work or not.