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Report

1. The probability of winning $80 within 1000 sequential bets is 100%. As seen by the Figure 1, every episode will saturate to $80 well before the full 1000 bets are exhausted. This is true because we have an unlimited budget to work with.
2. The expected value of our winnings after 1000 bets is around $71. This can be deduced from the Mean of 1000 simulations by taking their average.
3. The standard deviation does stabilize and converges to the value of $0. This is due to the fact that our bank roll is unlimited and we end up winning $80 for every possible episode.
4. To count probability, one can look at how many simulations reached $80 after 1000 bets and how many did not. This is done in code and results in a probability of 63.5% as 635/1000 runs resulted in an $80 win.
5. The expected value of our winnings after 1000 sequential bets is approximately -$31. This can be deduced from the Mean of 1000 simulations by taking their average.
6. The standard deviation does seem to stabilize and converge at the value of about $160. This can be attributed to the fact that our limited bank-roll which is always the maximum that we can lose.
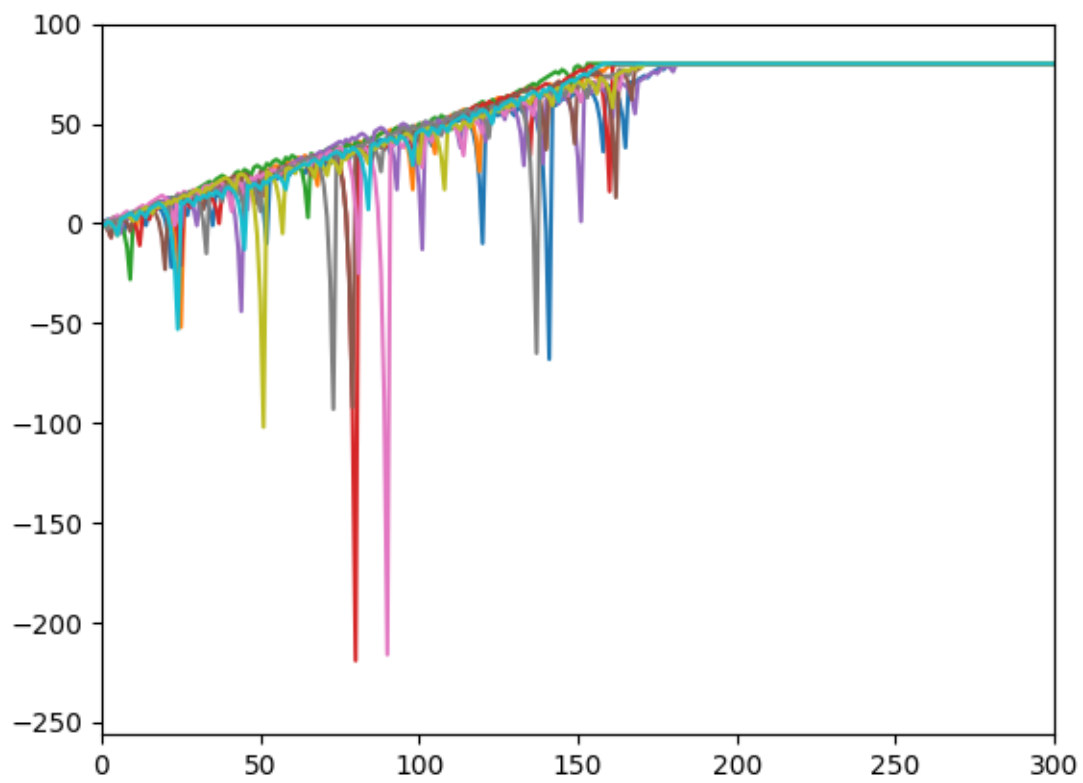
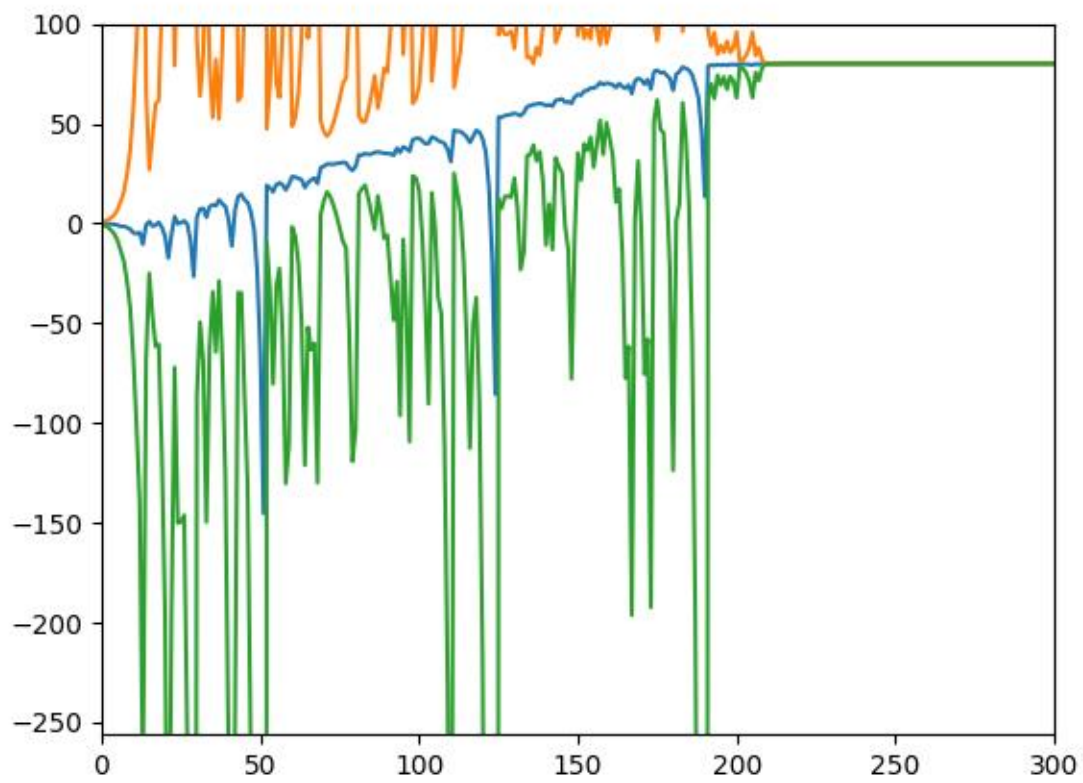**Figure 1: Experiment 1, winnings of 10 runs.**
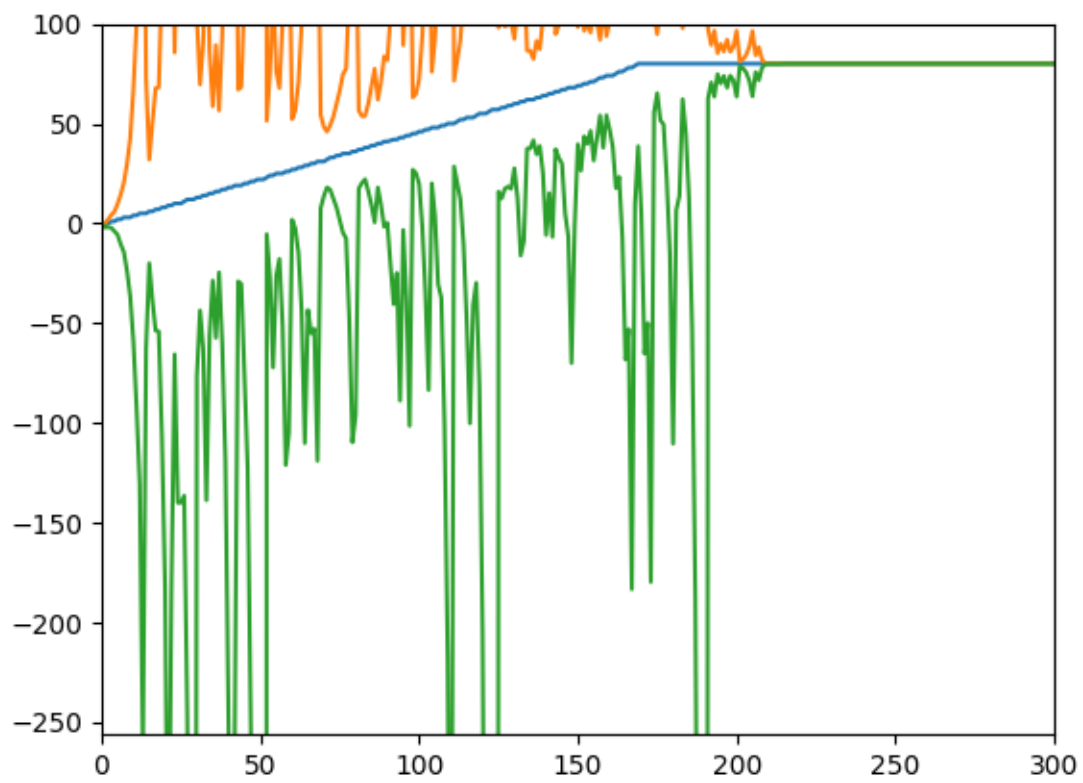
Figure 2: Experiment 1, mean of 1000 runs

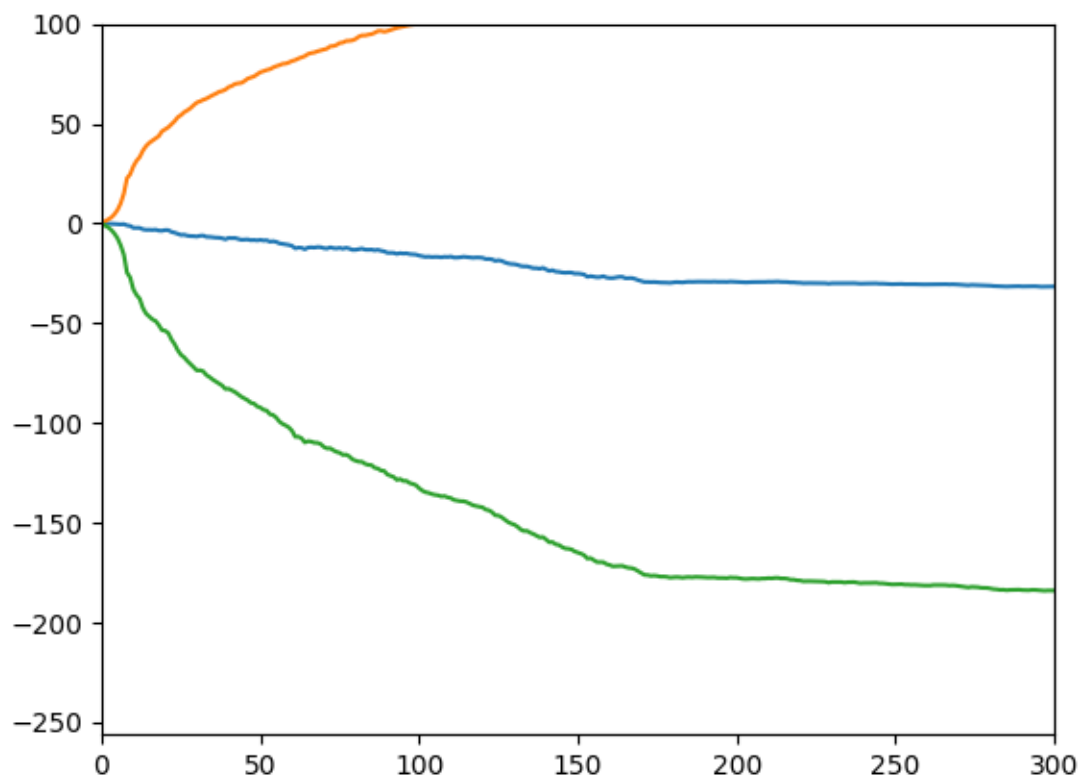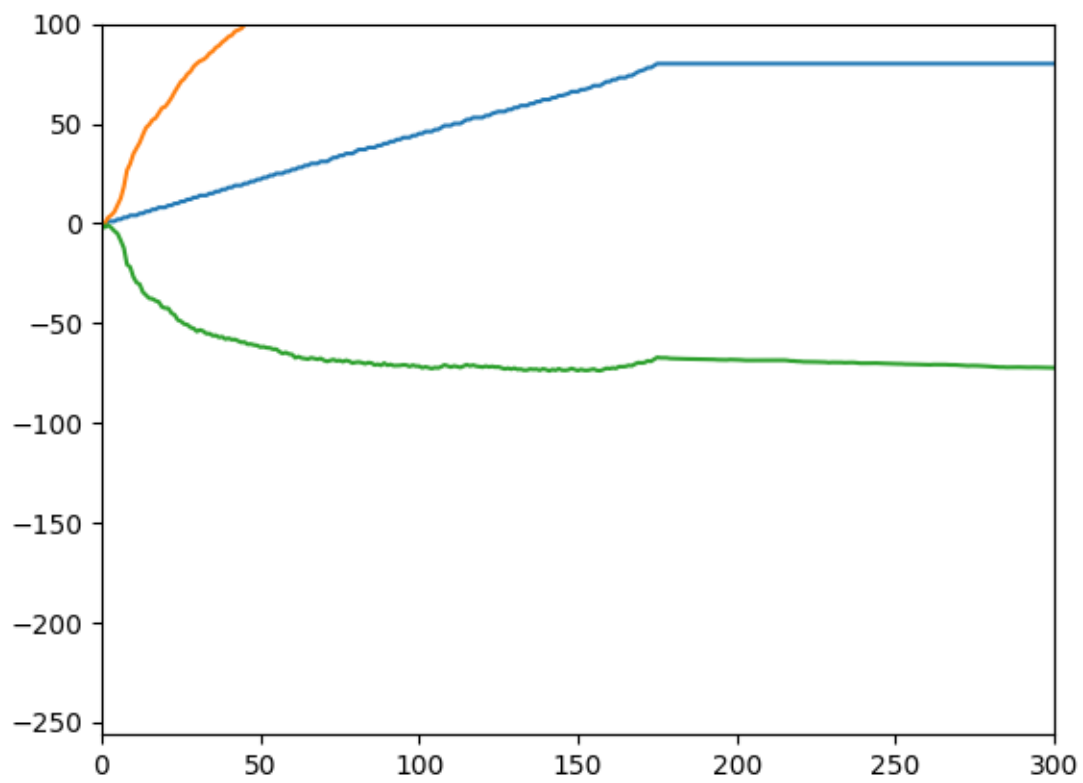**Figure 3: Experiment 3, median of 1000 runs**

Figure 4: Experiment 2, mean of 1000 runs

Figure 5: Experiment 2, median of 1000 runs