

# On the Sequential Selection Problem\*

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## ABSTRACT

Kwan and Yuan [13] considered the sequential selection problem in which an employer should arrange the sequence of interviews with job applicants to fill a position. In this note, it is shown that their selection problem would be alternately interpreted as an optimal search problem or, more specifically, a discrete search problem with a stationary target. A more generalized version of the ordering problem is proposed which explicitly considers the time value of money. Also, the optimality of the ordering strategy in the generalized problem is proven by the pair-wise exchange method, which is simpler than the induction hypothesis-based proof. The sequential selection problem is shown to be a special case of the general ordering problem where the discount rate is zero.

*Subject Areas: Capital Budgeting, Decision Analysis, Financial Planning, Modeling, and Search Theory.*

## PROBLEM DEFINITION

In this note, we consider an ordering problem in which a decision maker should determine a sequence of job offers to be made so the expected total benefit is maximized. Let  $p_i$  be the probability that applicant  $i$  accepts the job if offered and  $c_i$  be the expected cost of interviewing applicant  $i$  ( $i=1,2, \dots, n$ ). If applicant  $i$  accepts the offer, the decision maker receives a reward  $b_i$  and terminates the search process. Suppose also that it takes time  $t_i$  to interview applicant  $i$ . This framework easily can be adopted in other settings such as the capital investment problem [14] or the R&D project selection problem [10].

Knowing a discount rate  $\beta$  ( $0 \leq \beta < 1$ ) and the parameters  $p_i$ ,  $c_i$ ,  $b_i$ , and  $t_i$ , how should the decision maker arrange the order of job interviews to maximize the expected total discounted benefit? Intuitively, the decision maker would balance between the immediate reward and the future reward which is made less likely by the probability of failure and less profitable by discounting. The model corresponding to such a decision situation under certain assumptions is commonly referred to as the optimal (linear) ordering problem.

## PROBLEM MOTIVATION

The problem considered in this paper was motivated by a recent article in *Decision Sciences*. Kwan and Yuan [13] addressed the sequential selection problem in which an employer should arrange the order of applicants to be interviewed. The objective was to find an ordering strategy that maximizes the expected net benefit, without considering the time value of money.

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