Relationship between decision, optimization, and construction problems

We define Algorithm $\mathcal{C}$ to find a maximum matching, as follows. The input is graph $G = (V, E)$. If $E = \emptyset$, we return $\emptyset$. Otherwise, let $E = \{e_1, e_2, \ldots, e_m\}$, and let $k = \mathcal{B}(G)$.

- Let G^* be a copy of G
- For $i = 1$ up to m DO
  - Let G' be the graph obtained by deleting edge e_i (but not the endpoints of e_i) from G^*.
  - If $\mathcal{A}(G', k) = YES$, then set $G^* := G'$.
- Return the edge set $E(G^*)$ of G^*.

It is easy to see that $\mathcal{C}$ calls $\mathcal{B}$ once, calls $\mathcal{A}$ at most m times, and does at most $O(m)$ other operations. Hence the running time satisifes the required bounds.
What about accuracy?