5 Algorithm Design

Given two inputs, an array of integers n and a single integer k, design an algorithm that returns true if there are a pair of integers i, j in n such that n[i] and n[j] sum up to k and i ≠ j and false if no such pair exists.

Clearly state any reasonable assumptions that you make.

Provide a big-O worst-case analysis of your algorithm for both memory and runtime and defend your answer.

```
HashSet<Integer> a;
for each integer i in n:
        a.add(n(i));
ends

for each integer i in keyset of a:
    if a.contains(k-i) return true;
end;
return false;
```

runtime: $O(n) + O(n) = O(n)$.

memory: $O(n)$