

★Describe a  $\Theta(n \lg n)$ -time algorithm that, given a set  $S$  of  $n$  integers and another integer  $x$ , determines whether or not there exists two elements of  $S$  whose sum is exactly  $x$ .

```
SEARCH-SUM( $S, x$ )
  MERGE-SORT( $S$ )
  for  $i = 1$  to  $S.length$ 
    index = BINARY-SEARCH( $S, x - S[i], 1, S.length$ )
    if index  $\neq$  NIL
      return index
  return NIL
```