

$$[1, 2, 5, 6, 10] \quad T = 8$$

BF
 $i: 0 \rightarrow n-2$
 $j: i+1 \rightarrow n-1 \Rightarrow$ Linear search for Target - arr[i]
 $TC = O(n^2)$

BF with Binary Search: $O(n \cdot \log(n))$

HashSet-Based
 $[1, 2, 5, 6, 10], T=8$
 $\{1, 2, 5\}$
Temp

$$TC = O(n)$$

$$AS = O(n)$$

2-ptn Based
 $[1, 2, 5, 6, 10]$
 $1+6 = 7$
 $s = 8$
 $s = 7$

$TC = O(n)$
 $AS = O(1)$

BF:
 $i: 0 \rightarrow n-3$
 $j: i+1 \rightarrow n-2$
 $k: j+1 \rightarrow n-1$

$$TC = O(n^3)$$

HashSet-Set Approach:
 $i: 0 \rightarrow n-3$
 $[\text{HashSet-based pair sum to find Target} - arr[i]]$

$$TC: O(n^2)$$

$$AS: O(n)$$

Sorting-Based
 $i: 0 \rightarrow n-3$
 $[\text{2-ptn approach to find pair with target} - arr[i]]$

$$TC: O(n \log n) + O(n^2) = O(n^2)$$

$$AS: O(1)$$

	<u>BF</u>	<u>2-ptn Based</u>
<u>2-sum</u>	$O(n^2)$	$O(n)$
<u>3-sum</u>	$O(n^3)$	$O(n^2)$
<u>4-sum</u>	$O(n^4)$	$O(n^3)$
\vdots		
<u>K-sum</u>	$O(n^k)$	$O(n^{k-1})$

$(i, arr, k, target)$
 $arr[i] \rightarrow (i+1, arr, k-1, t - arr[i])$
 $arr[i+1] \rightarrow (i+2, arr, k-1, t - arr[i+1])$
 \vdots

Base case $k=2$