Array Practice Problems

1) Write a program in the following steps
    a) Generates 10 Random 3 Digit number.
    b) Store these random numbers into an array.
    c) Then find the 2nd largest and the 2nd smallest element without sorting the array.

```
#!/bin/bash -x
for (( i=0;i<=10;i++ ))
do
  randomNumber[$i]=$((RANDOM%900 + 100));
done
echo ${randomNumber[@]};

secondLargest=$(printf '%s\n' "${randomNumber[@]}" | sort -n | tail -2 | head -1);
secondSmallest=$(printf '%s\n' "${randomNumber[@]}" | sort -n | head -2 | tail -1);
echo "Second Largest: "$secondLargest;
echo "Second Smallest: "$secondSmallest;
```

2) Extend the above program to sort the array and then find the 2nd largest and the 2nd smallest element.

```
#!/bin/bash -x
for (( i=0;i<10;i++ ))
do
  randomNumber[$i]=$((RANDOM%900 + 100));
done

echo ${randomNumber[@]};
randomNumberLength=${#randomNumber[@]};

for (( i=0;i<$randomNumberLength;i++ ))
do
  for (( j=i+1;j<$randomNumberLength;j++ ))
  do
    if [ ${randomNumber[i]} -gt ${randomNumber[j]} ];
    then
      temp=${randomNumber[i]};
      randomNumber[$i]=${randomNumber[j]};
      randomNumber[$j]=$temp;
    fi
  done
done
```

```
echo "Array element after sorting are:" ${randomNumber[@]};
echo "Second largest element is:" ${randomNumber[$(($randomNumberLength-2))]};
echo "Second smallest element is:" ${randomNumber[1]};
```

3) Extend the Prime Factorization Program to store all the Prime Factors fo a number n into an array and finally display the output.

```
#!/bin/bash -x
read -p "Enter Number:" number;
k=0;
for (( i=2;i*i<=$number;i++ ))
do
  if [ $(($number%$i)) -eq 0 ]
  then
    factor=$i
    count=0;
    for(( j=1;j<=$factor;j++ ))
    do
      n=$(($factor%$j));
      if [ $n -eq 0 ];
      then
        count=$(($count+1));
      fi
    done
    if [ $count -eq 2 ];
    then
      primeFactors[$k]="$factor";
      k=$(($k+1));
    fi
  fi
done
echo "Prime Factors of Number:" ${primeFactors[@]};
```

4) Write a Program to show the Sum of three Integer adds to ZERO.

```
#!/bin/bash -x

function findSumZero() {
for (( i=0;i<$(($arrayLength-2));i++ ))
do
  for (( j=$(($i+1));j<$(($arrayLength-1));j++ ))
  do
```

```
    for (( k=$(($j+1));k<$arrayLength;k++ ))
    do
      if [ $(( ${array[$i]} + ${array[$j]} + ${array[$k]} )) -eq 0 ]
      then
        echo ${array[$i]} ${array[$j]} ${array[$k]}
      fi
    done
  done
done
}

array[0]="0";
array[1]="-1";
array[2]="-3";
array[3]="2";
array[4]="1";

echo ${array[@]};
arrayLength=${#array[@]};
findSumZero ${array[@]} $arrayLength;
```

5) Take a range from 0 - 100, find the digits that are repeated twice like 33, 77, etc and store them in an array.

```
#!/bin/bash -x
counter=0;
index=0;
while [[ counter -le 100 ]]
do
  (( counter++ ));
  unitPlace=$(( $counter%10 ));
  tenPlace=$(( $counter/10 ));
  if [[ $unitPlace -eq $tenPlace ]]
  then
    twiceDigitArray[index]=$counter;
    (( index++ ));
  fi
done
echo "Digits that are repeated twice:" ${twiceDigitArray[@]};
```