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Paper Code: CMSA CC – VI

Topic: Programming in Bash shell

Question 1. Write a shell program to print the sum of digits of a given number.

Program 1.

```
# program to add the digits of a number

echo "Enter a number"

read n
sum=0
while [ $n -gt 0 ]
do
    d=`expr $n % 10`
    sum=`expr $sum + $d`
    n=`expr $n / 10`
done
echo "Sum of digits" $sum
```

Output:

```
Enter a number
12352
Sum of digits 13
```

Question 2. Write a shell program to check whether a given number is a prime number or not.

Program 2.

```
# program to check whether a number is prime
echo "Enter a number"
read n
if [ $n -le 1 ]
then
    echo "Not prime"
    exit
fi
for (( i=2; i*i <= n; i++ ))
do
    if [ `expr $n % $i` -eq 0 ]
    then
        echo "Not a prime number"
        exit
    fi
done
echo "Prime number"
```

Output:

```
Enter a number
17
Prime number
```

Question 3. Write a shell program to check whether a given number is a perfect number or not.

Program 3.

```
echo "Enter a number:"
read a
i=1
fact=0
while [ $i -lt $a ]
do
    if [ `expr $a % $i` -eq 0 ]
    then
        fact=`expr $fact + $i`
    fi

    i=`expr $i + 1`
done
if [ $fact -eq $a ]
then
    echo "Perfect Number"
else
    echo "Not a perfect number"
fi
```

Output:

```
Enter a number:
6
Perfect Number
```

Question 4. Write a program to check whether a number is a palindrome or not.

Program 4.

```
# program to check whether a given number is palindrome
echo "Enter a number"
read n
m=$n
rev=0
while [ $n -gt 0 ]
do
    d=`expr $n % 10`
    rev=`expr $rev \* 10 + $d`
    n=`expr $n / 10`
done
if [ $rev -eq $m ]
then
    echo "Palindrome"
else
    echo "Not palindrome"
fi
```

Output:

```
Enter a number
12321
Palindrome
```

Question 5. Write a program to check whether a number is an automorphic number or not.

Program 5.

```
echo "Enter a number: "
read num
show=`expr $num`
flag=1
square=`expr $num \* $num`
while [ $num -gt 0 ]
do
    flag1=`expr $num % 10`
    flag2=`expr $square % 10`
    if [ $flag1 -ne $flag2 ]
    then
        flag=0
        break
    fi
    num=`expr $num / 10`
```

```

        square=`expr $square / 10`
done
if [ $flag -eq 0 ]
then
    echo $show "is not an automorphic number"
else
    echo $show "is an automorphic number"
fi

```

Output:

```

Enter a number:
76
76 is an automorphic number

```

Question 6. Write a shell program to perform binary search on an array.

Program 6.

```

echo "Enter the size of the array"
read n
echo "Enter" $n "numbers"
for ((i=0; i<n; i++))
do
    read a[$i]
done
for ((i=0; i<n; i++))
do
    for ((j=i+1; j<n; j++))
    do
        if [ ${a[$i]} -gt ${a[$j]} ]
        then
            temp=${a[$i]}
            a[$i]=${a[$j]}
            a[$j]=$temp
        fi
    done
done
echo "Enter the number to be searched in the array"
read key
lo=0
hi=`expr $n - 1`
while [ $lo -le $hi ]
do
    mid=`expr $lo + $hi`

```

```

mid=`expr $mid / 2`

if [ ${a[$mid]} -eq $key ]
then
    echo $key "found at index" $mid
    exit
elif [ ${a[$mid]} -gt $key ]
then
    hi=`expr $mid - 1`
else
    lo=`expr $mid + 1`
fi
done
echo $key "is not present in the array"

```

Output:

```

Enter the size of the array
5
Enter 5 numbers
12
17
58
64
76
Enter the number to be searched in the array
64
64 found at index 3

```

Question 7. Write a shell program to sort a given array using bubble sort technique.

Program 7.

```

echo "Enter the size of the array"
read n
echo "Enter" n "numbers"
for ((i=0; i<n; i++))
do
    read a[$i]
done
for ((i=0; i<n; i++))
do
    for ((j=i+1; j<n; j++))
    do
        if [ ${a[$i]} -gt ${a[$j]} ]
        then

```

```

                temp=${a[$i]}
                a[$i]=${a[$j]}
                a[$j]=$temp
            fi
        done
done
echo "Sorted array is"
for ((i=0; i<n; i++))
do
    echo ${a[$i]}
done

```

Output:

```

Enter the size of the array
5
Enter 5 numbers
65
2
122
58
36
Sorted array is
2
36
58
65
122

```

Question 8. Write a program to sort an array using selection sort technique.

Program 8.

```

echo "Enter the size of the array"
read n
echo "Enter" $n "numbers"
for ((i=0; i<n; i++))
do
    read a[$i]
done
for ((i=0; i<n; i++))
do
    minidx=$i
    for ((j=i+1; j<n; j++))
    do
        if [ ${a[$minidx]} -gt ${a[$j]} ]

```

```

        then
            minidx=$j
        fi
    done
    temp=${a[$minidx]}
    a[$minidx]=${a[$i]}
    a[$i]=$temp
done
echo "Sorted array = "
for ((i=0; i<n; i++))
do
    echo ${a[$i]}
done

```

Output:

```

Enter the size of the array
5
Enter 5 numbers
3
1
55
20
99
Sorted array =
1
3
20
55
99

```