Operating Systems

Lab Assignment 3

Make shell scripts for the following Questions :

1. To find Largest of Three Numbers

```
>_ main.sh
1  echo "Enter three numbers:"
2  read a b c
3  if [ $a -ge $b ] && [ $a -ge $c ]; then
4    echo "$a is the largest"
5  elif [ $b -ge $a ] && [ $b -ge $c ]; then
6    echo "$b is the largest"
7  else
8    echo "$c is the largest"
9  fi
10
```

```
~/workspace$ bash main.sh
Enter three numbers:
23 34 45
45 is the largest
```


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2. To find a year is leap year or not.

```
>_ main.sh
1  #!/bin/bash
2  echo "Enter a year:"
3  read year
4  if (( (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0) )); then
5    echo "$year is a leap year"
6  else
7    echo "$year is not a leap year"
8  fi
9
```

```
~/workspace$ bash main.sh
Enter a year:
2004
2004 is a leap year
~/workspace$
```

---

3. To input angles of a triangle and find out whether it is valid triangle or not.

```
>_ main.sh
1  echo "Enter three angles:"
2  read a b c
3  sum=$((a + b + c))
4  if [ $sum -eq 180 ] && [ $a -gt 0 ] && [ $b -gt 0 ] && [ $c -gt 0 ]; then
5    echo "Valid triangle"
6  else
7    echo "Invalid triangle"
8  fi
```

```
~/workspace$ bash main.sh
Enter three angles:
35 45 120
Invalid triangle
```

---

4. To check whether a character is alphabet, digit or special character.

```
>_ main.sh
1  echo "Enter a character:"
2  read char
3  if [[ "$char" =~ [A-Za-z] ]]; then
4    echo "Alphabet"
5  elif [[ "$char" =~ [0-9] ]]; then
6    echo "Digit"
7  else
8    echo "Special character"
9  fi
```

```
~/workspace$ bash main.sh
Enter a character:
s
Alphabet
```

---

5. To calculate profit or loss

```
>_ main.sh
1  echo "Enter cost price and selling price:"
2  read cp sp
3  if [ $sp -gt $cp ]; then
4    profit=$((sp - cp))
5    echo "Profit of $profit"
6  elif [ $cp -gt $sp ]; then
7    loss=$((cp - sp))
8    echo "Loss of $loss"
9  else
10   echo "No profit no loss"
```

```
~/workspace$ bash main.sh
Enter cost price and selling price:
45 55
Profit of 10
```

---

6. To print all even and odd number from 1 to 10


```
>_ main.sh
1  echo "Even numbers:"
2  for ((i=1;i<=10;i++)); do
3    if (( i % 2 == 0 )); then
4      echo $i
5    fi
6  done
7
8  echo "Odd numbers:"
9  for ((i=1;i<=10;i++)); do
10   if (( i % 2 != 0 )); then
11     echo $i
12   fi
13 done
14
```

```
~/workspace$ bash main.sh
Even numbers:
2
4
6
8
10
Odd numbers:
1
3
5
7
9
```

---

7. To print table of a given number

```
>_ main.sh
1  read -p "Enter a number: " num
2  for ((i=1; i<=10; i++)); do
3    echo "$num x $i = $((num*i))"
4  done
5
```

```
~/workspace$ bash main.sh
Enter a number: 18
18 x 1 = 18
18 x 2 = 36
18 x 3 = 54
18 x 4 = 72
18 x 5 = 90
18 x 6 = 108
18 x 7 = 126
18 x 8 = 144
18 x 9 = 162
18 x 10 = 180
```

---

8. To find factorial of a given integer

```
>_ main.sh
1  read -p "Enter a number: " n
2  fact=1
3  for ((i=1;i<=n;i++)); do
4    fact=$((fact*i))
5  done
6  echo "Factorial of $n is $fact"
```

```
~/workspace$ bash main.sh
Enter a number: 18
Factorial of 18 is 6402373705728000
```

---

9. To print sum of all even numbers from 1 to 10.

```
>_ main.sh
1  sum=0
2  for ((i=1;i<=10;i++)); do
3    if (( i % 2 == 0 )); then
4      sum=$((sum+i))
5    fi
6  done
7  echo "Sum of even numbers from 1 to 10 is $sum"
```

```
~/workspace$ bash main.sh
Sum of even numbers from 1 to 10 is 30
```

---

10. To print sum of digit of any number.


```
>_ main.sh
1  read -p "Enter a number: " n
2  sum=0
3  while [ $n -gt 0 ]; do
4    digit=$((n % 10))
5    sum=$((sum + digit))
6    n=$((n / 10))
7  done
8  echo "Sum of digits is $sum"
```

```
~/workspace$ bash main.sh
Enter a number: 18
Sum of digits is 9
```

---

11. To make a basic calculator which performs addition, subtraction, Multiplication, division.

```
>_ main.sh
1   read -p "Enter first number: " a
2   read -p "Enter second number: " b
3   read -p "Choose operation (+, -, *, /): " op
4
5   case $op in
6     +) echo "Result: $((a + b))";;
7     -) echo "Result: $((a - b))";;
8     \*) echo "Result: $((a * b))";;
9     /) echo "Result: $((a / b))";;
10    *) echo "Invalid operation";;
11  esac
```

```
~/workspace$ bash main.sh
Enter first number: 18
Enter second number: 25
Choose operation (+, -, *, /): *
Result: 450
```


---

12. To print days of a week.

```
>_ main.sh
1   days=("Sunday" "Monday" "Tuesday" "Wednesday" "Thursday" "Friday" "Saturday")
2   for day in "${days[@]}"; do
3     echo $day
4   done
```

```
~/workspace$ bash main.sh
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
```

---

13. To print starting 4 months having 31 days.

```
>_ main.sh
1  months_with_31=("January" "March" "May" "July" "August" "October" "December")
2
3  echo "First 4 months having 31 days are:"
4  for ((i=0; i<4; i++)); do
5    echo "${months_with_31[$i]}"
6  done
```

```
~/workspace$ bash main.sh
January
March
May
July
```

---

14. Using functions,
    a. To find given number is Armstrong number or not.


```
>_ main.sh
1  is_armstrong() {
2    num=$1
3    sum=0
4    temp=$num
5    while [ $temp -gt 0 ]; do
6      digit=$((temp % 10))
7      sum=$((sum + digit * digit * digit))
8      temp=$((temp / 10))
9    done
10   if [ $sum -eq $num ]; then
11     echo "$num is an Armstrong number"
12   else
13     echo "$num is not an Armstrong number"
14   fi
15 }
16 read -p "Enter a number: " n
17 is_armstrong $n
```

```
~/workspace$ bash main.sh
Enter a number: 789
789 is not an Armstrong number
```

---

b. To find whether a number is palindrome or not.

```
>_ main.sh
1  is_palindrome() {
2    num=$1
3    rev=0
4    temp=$num
5    while [ $temp -gt 0 ]; do
6      digit=$((temp % 10))
7      rev=$((rev * 10 + digit))
8      temp=$((temp / 10))
9    done
10   if [ $rev -eq $num ]; then
11     echo "$num is a palindrome"
12   else
13     echo "$num is not a palindrome"
14   fi
15 }
16 read -p "Enter a number: " n
17 is_palindrome $n
```

```
~/workspace$ bash main.sh
Enter a number: 121
121 is a palindrome
```


---

c. To print Fibonacci series up-to n terms.

```
>_ main.sh
1  fibonacci() {
2    n=$1
3    a=0
4    b=1
5    echo -n "$a $b "
6    for ((i=2;i<n;i++)); do
7      fib=$((a + b))
8      echo -n "$fib "
9      a=$b
10     b=$fib
11   done
12 }
13 read -p "Enter number of terms: " n
14 fibonacci $n
```

```
~/workspace$ bash main.sh
Enter number of terms: 5
0 1 1 2 3 ~/workspace$
```

---

d. To find given number is prime or composite.

main.sh

```
is_prime() {
  num=$1
  if [ $num -lt 2 ]; then
    echo "Not prime"
    return
  fi
  for ((i=2;i<=num/2;i++)); do
    if ((num % i == 0)); then
      echo "$num is composite"
      return
    fi
  done
  echo "$num is prime"
}
read -p "Enter a number: " n
is_prime $n
```

```
~/workspace$ bash main.sh
Enter a number: 87
87 is composite
```


---

e. To convert a given decimal number to binary equivalent.

main.sh

```
decimal_to_binary() {
  num=$1
  binary=""
  while [ $num -gt 0 ]; do
    binary=$((num % 2))$binary
    num=$((num / 2))
  done
  echo "Binary: $binary"
}
read -p "Enter a decimal number: " n
decimal_to_binary $n
```

```
~/workspace$ bash main.sh
Enter a decimal number: 45
Binary: 101101
```