**4ITRC2 Operating System Lab**

**Lab Assignment 3**

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Aim: To create shell scripts for the following questions

To Perform: To code and solve the following

* **shell scripts for following:-**

**Q: How to find the largest of three numbers?**

**A:**

read -p "Enter three numbers: " a b c

if ((a >= b && a >= c)); then

echo "$a is the largest"

elif ((b >= a && b >= c)); then

echo "$b is the largest"

else

echo "$c is the largest"

fi

**2. Q: How to check if a year is a leap year or not?**  
**A:**

read -p "Enter a year: " year

if (( (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0) )); then

echo "$year is a leap year"

else

echo "$year is not a leap year"

fi

**3. Q: How to check whether input angles form a valid triangle?**  
**A:**

read -p "Enter three angles: " a b c

if (( a + b + c == 180 && a > 0 && b > 0 && c > 0 )); then

echo "Valid triangle"

else

echo "Invalid triangle"

fi

**4. Q: How to check if a character is an alphabet, digit, or special character?**  
**A:**

* read -p "Enter a character: " char

if [[ $char =~ [A-Za-z] ]]; then

echo "Alphabet"

elif [[ $char =~ [0-9] ]]; then

echo "Digit"

else

echo "Special character"

fi

**5. Q: How to calculate profit or loss?**  
**A:**

read -p "Enter cost price and selling price: " cp sp

if (( sp > cp )); then

echo "Profit: $((sp - cp))"

elif (( sp < cp )); then

echo "Loss: $((cp - sp))"

else

echo "No profit, no loss"

fi

**6. Q: How to print even and odd numbers from 1 to 10?**  
**A:**

* echo "Even Numbers:"

for i in {1..10}; do ((i % 2 == 0)) && echo $i; done

* echo "Odd Numbers:"

for i in {1..10}; do ((i % 2 != 0)) && echo $i; done

**7. Q: How to print the multiplication table of a given number?**  
**A:**

read -p "Enter a number: " num

for ((i=1;i<=10;i++)); do

echo "$num x $i = $((num \* i))"

done

**8. Q: How to find the factorial of a number?**  
**A:**  
read -p "Enter a number: " n

fact=1

for ((i=2;i<=n;i++)); do

fact=$((fact \* i))

done

echo "Factorial: $fact"

**9. Q: How to print the sum of all even numbers from 1 to 10?**  
**A:**  
sum=0

for i in {1..10}; do

((i % 2 == 0)) && ((sum += i))

Done

**10. Q: How to print the sum of digits of any number?**  
**A:**

echo "Sum of even numbers: $sum"

**11. Q: How to make a basic calculator (add, subtract, multiply, divide)?**  
**A:**  
read -p "Enter a number: " num

sum=0

while (( num > 0 )); do

sum=$((sum + num % 10))

num=$((num / 10))

done

echo "Sum of digits: $sum"

**12. Q: How to print days of the week?**  
**A:**  
days=(Sunday Monday Tuesday Wednesday Thursday Friday Saturday)

for day in "${days[@]}"; do echo "$day"; done

**13. Q: How to print the first 4 months that have 31 days?**  
**A:**  
echo "January March May July"

**14. Q: Function-based Tasks**

* **14.a Q: How to check if a number is an Armstrong number (using function)?**  
  **A:**  
  is\_armstrong() {

num=$1; sum=0; temp=$num

while ((temp > 0)); do

digit=$((temp % 10))

sum=$((sum + digit\*\*3))

temp=$((temp / 10))

done

((sum == num)) && echo "Armstrong" || echo "Not Armstrong"

}

read -p "Enter number: " n

is\_armstrong $n

**14.b Q: How to check if a number is a palindrome (using function)?**  
**A:**

is\_palindrome() {

num=$1; rev=0; temp=$num

while ((temp > 0)); do

digit=$((temp % 10))

rev=$((rev \* 10 + digit))

temp=$((temp / 10))

done

((rev == num)) && echo "Palindrome" || echo "Not Palindrome"

}

read -p "Enter number: " n

is\_palindrome $n

**14.c Q: How to print Fibonacci series up to n terms (using function)?**  
**A:**

fibonacci() {

n=$1; a=0; b=1

for ((i=0; i<n; i++)); do

echo -n "$a "

fn=$((a + b)); a=$b; b=$fn

done

}

read -p "Enter number of terms: " n

fibonacci $n

**14.d Q: How to check if a number is prime or composite (using function)?**  
**A:**  
 is\_prime() {

n=$1

if ((n <= 1)); then echo "Not Prime"; return; fi

for ((i=2; i\*i<=n; i++)); do

((n % i == 0)) && echo "Composite" && return

done

echo "Prime"

}

read -p "Enter number: " n

is\_prime $n

**14.e Q: How to convert a decimal number to binary (using function)?**  
**A:**

to\_binary() {

num=$1; bin=""

while ((num > 0)); do

bin=$((num % 2))$bin

num=$((num / 2))

done

echo "Binary: ${bin:-0}"

}

read -p "Enter decimal number: " n

to\_binary $n