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1. Addition

INPUT

```
#!/bin/bash
echo "Enter first number:"
read num1
echo "Enter second number:"
read num2
sum=$((num1 + num2))
echo "Sum: $sum"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter first number:
3
Enter second number:
5
Sum: 8
```

2. **Subtraction**

INPUT

```
#!/bin/bash
echo "Enter first number:"
read num1
echo "Enter second number:"
read num2
diff=$((num1 - num2))
echo "Difference: $diff"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter first number:
10
Enter second number:
6
Difference: 4
```

3. Multiplication

INPUT

```
#!/bin/bash
echo "Enter first number:"
read num1
echo "Enter second number:"
read num2
prod=$((num1 * num2))
echo "Product: $prod"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter first number:
4
Enter second number:
5
Product: 20
```

4. Division

INPUT

```
#!/bin/bash
echo "Enter first number:"
read num1
echo "Enter second number:"
read num2
if [ $num2 -eq 0 ]; then
   echo "Error: Division by zero!"
else
   div=$((num1 / num2))
   echo "Quotient: $div"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter first number:
8
Enter second number:
2
Quotient: 4
```

5. Modulus

INPUT

```
#!/bin/bash
echo "Enter first number:"
read num1
echo "Enter second number:"
read num2
mod=$((num1 % num2))
echo "Remainder: $mod"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter first number:
10
Enter second number:
3
Remainder: 1
```

6. **Find Largest of Two Numbers**

INPUT

```
#!/bin/bash
# Program to find the largest number
echo "Enter first number:"
read num1
echo "Enter second number:"
read num2
if [ $num1 -gt $num2 ]; then
  echo "Largest number: $num1"
else
  echo "Largest number: $num2"
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter first number:
10
Enter second number:
20
Largest number: 20
```

7. **Find Smallest of Two Numbers**

INPUT

```
#!/bin/bash
# Program to find the smallest number
echo "Enter first number:"
read num1
echo "Enter second number:"
read num2
if [ $num1 -lt $num2 ]; then
  echo "Smallest number: $num1"
else
  echo "Smallest number: $num2"
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter first number:
25
Enter second number:
45
Smallest number: 25
```

8. **Check Odd or Even**

INPUT

```
#!/bin/bash
echo "Enter a number:"
read num
if [ $((num % 2)) -eq 0 ]; then
  echo "Even"
else
  echo "Odd"
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a number:
5
Odd
```

9. **Factorial**

INPUT

```
#!/bin/bash
echo "Enter a number:"
read num
fact=1
for ((i=1; i<=num; i++))
do
  fact=$((fact * i))
done
echo "Factorial: $fact"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a number:
5
Factorial: 120
```

10. **Prime Number Check**

INPUT

```
#!/bin/bash
echo "Enter a number:"
read num
is_prime=1
for ((i=2; i<=num/2; i++))
do
  if [ $((num % i)) -eq 0 ]; then
    is_prime=0
    break
```

```
  fi
done
if [ $is_prime -eq 1 ]; then
  echo "Prime"
else
  echo "Not prime"
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a number:
29
Prime
```

11. **Fibonacci Sequence**

INPUT

```
#!/bin/bash
echo "Enter the number of terms:"
read num
a=0
b=1
echo "Fibonacci sequence:"
for ((i=0; i<num; i++))
do
  echo -n "$a "
  fn=$((a + b))
  a=$b
  b=$fn
done
```

OUTPUT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter the number of terms:
7
Fibonacci sequence:
0 1 1 2 3 5 8
```

12. **Check Leap Year**

INPUT

```
#!/bin/bash
echo "Enter a year:"
read year
if [ $((year % 4)) -eq 0 ] && [ $((year % 100)) -ne 0 ] || [ $((year % 400)) -eq 0 ]; then
  echo "Leap Year"
else
  echo "Not a Leap Year"
```

```
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a year:
2024
Leap Year
```

13. **Table of a Number**

INPUT

```
#!/bin/bash
echo "Enter a number:"
read num
echo "Table of $num:"
for ((i=1; i<=10; i++))
do
  echo "$num * $i = $((num * i))"
done
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a number:
4
Table of 4:
4 * 1 = 4
4 * 2 = 8
4 * 3 = 12
4 * 4 = 16
4 * 5 = 20
4 * 6 = 24
4 * 7 = 28
4 * 8 = 32
4 * 9 = 36
4 * 10 = 40
```

14. **Check Positive or Negative Number**

INPUT

```
#!/bin/bash
echo "Enter a number:"
read num
if [ $num -gt 0 ]; then
  echo "Positive"
elif [ $num -lt 0 ]; then
  echo "Negative"
else
  echo "Zero"
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a number:
90
Positive
```

15. **Reverse a String**

INPUT

```
#!/bin/bash
echo "Enter a string:"
read str
rev_str=$(echo $str | rev)
echo "Reversed string: $rev_str"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a string:
hallo
Reversed string: ollah
```

16. **Convert Celsius to Fahrenheit**

INPUT

```
#!/bin/bash
echo "Enter temperature in Celsius:"
read celsius
fahrenheit=$(( (celsius * 9/5) + 32 ))
echo "$celsius°C = $fahrenheit°F"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter temperature in Celsius:
28
28°C = 82°F
```

17. **Convert Fahrenheit to Celsius**
INPUT
```
#!/bin/bash
echo "Enter temperature in Fahrenheit:"
read fahrenheit
celsius=$(( (fahrenheit - 32) * 5/9 ))
echo "$fahrenheit°F = $celsius°C"
```
OUTPT
```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter temperature in Fahrenheit:
77
77°F = 25°C
```

18. **Display Current Date and Time**
INPUT
```
#!/bin/bash
echo "Current Date and Time: $(date)"
```
OUTPT
```
abahy@abahy-virtual-machine:~$ bash add.sh
Current Date and Time: Sunday 23 March 2025 04:37:20 PM
```

19. **Create a New File**
INPUT
```
#!/bin/bash
echo "Enter filename:"
read filename
touch $filename
echo "File '$filename' created."
```
OUTPT
```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter filename:
text.txt
File 'text.txt' created.
```

20. **Remove a File**
INPUT
```
#!/bin/bash
echo "Enter filename to remove:"
read filename
rm $filename
echo "File '$filename' removed."
```
OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter filename to remove:
text.txt
File 'text.txt' removed.
```

21. **Check if File Exists**

INPUT

```
#!/bin/bash
echo "Enter filename to check:"
read filename
if [ -f $filename ]; then
  echo "File '$filename' exists."
else
  echo "File '$filename' does not exist."
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter filename to check:
text.txt
File 'text.txt' does not exist._
```

22. **Show Disk Space Usage**

INPUT

```
#!/bin/bash
echo "Disk space usage:"
du -sh *
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Disk space usage:
4.0K    abahy
4.0K    add.sh
4.0K    Desktop
4.0K    Documents
4.0K    Downloads
4.0K    Music
44K     Pictures
```

23. **Check if Directory Exists**

INPUT

```
#!/bin/bash
echo "Enter directory to check:"
read dir
if [ -d $dir ]; then
  echo "Directory '$dir' exists."
```

```
else
  echo "Directory '$dir' does not exist."
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter directory to check:
abahy
Directory 'abahy' exists.
```

24. **Declare and Access Elements of an Array**

INPUT

```
#!/bin/bash

fruits=("apple" "banana" "cherry")

echo "First element: ${fruits[0]}"  # apple
echo "Second element: ${fruits[1]}" # banana
echo "Third element: ${fruits[2]}"  # cherry
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
First element: apple
Second element: banana
Third element: cherry
```

25. **Find the Length of an Array**

INPUT

```
#!/bin/bash

colors=("red" "green" "blue" "yellow")

echo "The length of the array is: ${#colors[@]}"
```

```
abahy@abahy-virtual-machine:~$ bash add.sh
The length of the array is: 4
```

26. **Loop Through Array Elements**

INPUT

```
#!/bin/bash

animals=("dog" "cat" "bird" "fish")

for animal in "${animals[@]}"; do
  echo $animal
```

done
OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
dog
cat
bird
fish
```

27. **Append an Element to an Array**
INPUT

```
#!/bin/bash

numbers=(1 2 3)

numbers+=("4")

echo "Updated array: ${numbers[@]}"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Updated array: 1 2 3 4
```

28. **Access All Elements of an Array**
INPUT

```
#!/bin/bash

cities=("New York" "London" "Tokyo")

echo "All cities:"
for city in "${cities[@]}"; do
  echo $city
done
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
All cities:
New York
London
Tokyo
```

29. **Remove an Element from an Array**
INPUT

```
#!/bin/bash

fruits=("apple" "banana" "cherry" "orange")
```

```
unset 'fruits[1]'

echo "Updated array: ${fruits[@]}"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Updated array: apple cherry orange
```

30. **Array of Numbers and Perform Simple Math**

INPUT

```
#!/bin/bash

numbers=(10 20 30 40)

sum=$(( ${numbers[0]} + ${numbers[1]} ))
echo "The sum of the first two numbers: $sum"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
The sum of the first two numbers: 30
```

31. **Sort an Array**

INPUT

```
#!/bin/bash

numbers=(5 3 8 1 7)

sorted_numbers=($(for i in "${numbers[@]}"; do echo $i; done | sort))

echo "Sorted array: ${sorted_numbers[@]}"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Sorted array: 1 3 5 7 8
```

32. **Print "Hello, World!**

INPUT

```
#!/bin/bash
echo "Hello, World!"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Hello World!
```

33. **Reading Input from User**

INPUT

```
#!/bin/bash
echo "What is your name?"
read name
echo "Hello, $name!"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
What is your name?
abahy
Hello, abahy!
```

34. **Calculate the Square of a Number**

INPUT

```
#!/bin/bash
echo "Enter a number:"
read num
square=$(( num * num ))
echo "The square of $num is: $square"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a number:
10
The square of 10 is: 100
```

35. **Simple If-Else Statement**

INPUT

```
#!/bin/bash
echo "Enter a number:"
read num
if [[ $num -gt 10 ]]; then
  echo "$num is greater than 10"
else
  echo "$num is less than or equal to 10"
fi
```

OUTPT

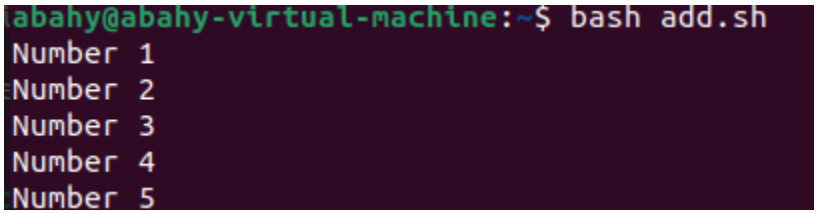
```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a number:
15
15 is greater than 10
```

36. **For Loop to Display Numbers 1 to 5**

INPUT

```
#!/bin/bash
for i in {1..5}; do
  echo "Number $i"
done
```

OUTPT

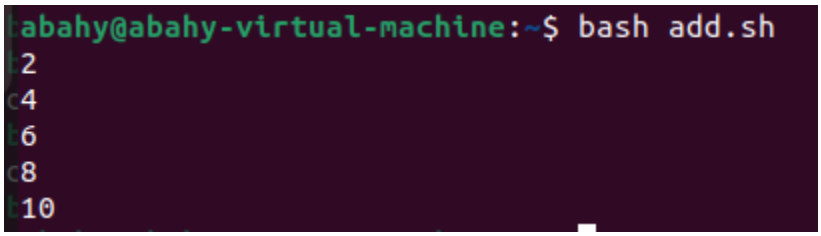


37. **While Loop to Display Even Numbers**

INPUT

```
#!/bin/bash
num=2
while [[ $num -le 10 ]]; do
  echo $num
  ((num+=2))
done
```

OUTPT



38. **Print Fibonacci Sequence**

INPUT

```
#!/bin/bash
a=0
b=1
echo "Fibonacci Sequence:"
for i in {1..10}; do
  echo $a
  fn=$((a + b))
  a=$b
  b=$fn
done
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Fibonacci Sequence:
0
1
1
2
3
5
8
13
21
34
```

39. **Sum of Digits of a Number**

INPUT

```
#!/bin/bash
echo "Enter a number:"
read num
sum=0
while (( num > 0 )); do
  digit=$(( num % 10 ))
  sum=$(( sum + digit ))
  num=$(( num / 10 ))
done
echo "Sum of digits: $sum"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter a number:
256
Sum of digits: 13
```

40. **Power of a Number**

INPUT

```
#!/bin/bash

echo "Enter the base number:"
read base
echo "Enter the exponent:"
read exp

result=1
for (( i=1; i<=exp; i++ )); do
  result=$(( result * base ))
done
```

```
echo "$base raised to the power of $exp is: $result"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter the base number:
5
Enter the exponent:
5
5 raised to the power of 5 is: 3125
```

41. **Find the Greatest of Three Numbers**

INPUT

```
#!/bin/bash

echo "Enter three numbers:"
read num1 num2 num3

if (( num1 >= num2 && num1 >= num3 )); then
  echo "$num1 is the greatest."
elif (( num2 >= num1 && num2 >= num3 )); then
  echo "$num2 is the greatest."
else
  echo "$num3 is the greatest."
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter three numbers:
15 356 899
899 is the greatest.
```

42. **Generate a Random Number Between Two Numbers**

INPUT

```
#!/bin/bash

echo "Enter the lower bound:"
read low
echo "Enter the upper bound:"
read high

random_num=$(( RANDOM % (high - low + 1) + low ))

echo "Random number between $low and $high: $random_num"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter the lower bound:
7
Enter the upper bound:
14
Random number between 7 and 14: 10
```

43. **Display User's Home Directory**
INPUT
#!/bin/bash
echo "Home Directory: $HOME
OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Home Directory: /home/abahy
```

44. **Get the Length of a String**
INPUT
#!/bin/bash
str="Hello"; echo ${#str}
OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
5
```

45. **Print the Current User's Name**
INPUT
#!/bin/bash
echo "Current user: $(whoami)"
OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Current user: abahy
```

46. **Print the Last 4 Lines of a File**
INPUT
#!/bin/bash
tail -n 4 myfile
OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
where are you
what u want
come here
lets go
```

47. **Check if a File is Empty**

INPUT

```
#!/bin/bash
echo "Enter the file name:"
read file_name
if [ ! -s "$file_name" ]; then
  echo "File is empty."
else
  echo "File is not empty."
fi
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter the file name:
myfile
File is not empty.
```

48. **Display the First 4 Lines of a File**

INPUT

```
#!/bin/bash
echo "Enter file name:"
read file_name
head -n 4 "$file_name"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ cat > file.txt
hi
come
stay happy
my name is this
what you want
ok bye'
```

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter file name:
file.txt
hi
come
stay happy
my name is this
```

49. **Print the System's Hostname**

INPUT

```
#!/bin/bash
echo "The system hostname is: $(hostname)"
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
The system hostname is: abahy-virtual-machine
```

50. **Remove directory**

INPUT

```
#!/bin/bash
echo "Enter the directory to remove:"
read dir_name
rmdir "$dir_name" && echo "Directory $dir_name removed successfully." || echo "Directory $dir_name could not be removed."
```

OUTPT

```
abahy@abahy-virtual-machine:~$ bash add.sh
Enter the directory to remove:
abahy
Directory abahy removed successfully.
```