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Demonstrate Node Programming Constructs

Sequence Practice Problems

1. **Use REPL –** Random Function ***Math.floor(Math.random() * 10);*** to get Single Digit.
2. **Use REPL –** Use Random to get Dice Number between 1 to 6
3. **Use REPL –** Add two Random Dice Number and Print the Result
4. **Use Script & Debug –** Write a program that reads 5 Random 2 Digit values , then find their sum and the average
5. **Use Script & Debug –** Unit Conversion
   a. 1ft = 12 in then 42 in = ? ft
   b. Rectangular Plot of 60 feet x 40 feet in meters
   c. Calculate area of 25 such plots in acres

If Statements

```
if ((age >= 14) && (age < 19)) {          // logical condition
    status = "Eligible.";                 // executed if condition is true
} else {                                  // else block is optional
    status = "Not eligible.";             // executed if condition is false
}
```

Selection Practice Problems with if & else

1. Write a program that reads 5 Random 3 Digit values and then outputs the minimum and the maximum value
2. Write a program that takes day and month from the command line and prints true if day of month is between March 20 and June 20, false otherwise.
3. Write a program that takes a year as input and outputs the Year is a Leap Year or not a Leap Year. A Leap Year checks for 4 Digit Number, Divisible by 4 and not 100 unless divisible by 400.
4. Write a program to simulate a coin flip and print out "Heads" or "Tails" accordingly.

Selection Practice Problems with if else if and else

1. Read a single digit number and write the number in word
2. Read a Number and Display the week day (Sunday, Monday,…)
3. Read a Number 1, 10, 100, 1000, etc and display unit, ten, hundred,…
4. Enter 3 Numbers do following arithmetic operation and find the one that is maximum and minimum
    1. a + b * c
    2. a % b + c
    3. c + a / b
    4. a * b + c

Case Statements

```
switch (new Date().getDay()) {          // input is current day
    case 0:                             // if (day == 0)
        text = "Sunday";
        break;
    case 1:                             // if (day == 1)
        text = "Monday";
        break;
    case 6:                             // if (day == 6)
        text = "Saturday";
        break;
    default:                            // else...
        text = "Whatever";
}
```

Selection Practice Problems with case statements

1. Read a single digit number and write the number in word using Case
2. Read a Number and Display the week day (Sunday, Monday,…)
3. Read a Number 1, 10, 100, 1000, etc and display unit, ten, hundred,…
4. Write a program that takes User Inputs and does Unit Conversion of different Length units
    1. Feet to Inch
    2. Feet to Meter
    3. Inch to Feet
    4. Meter to Feet

for Loop Statement

```
let dogs = ["Bulldog", "Beagle", "Labrador"];

// OLD WAY
var allDogs = "";
for (var i = 0; i < dogs.length; i++) {
    allDogs += dogs[i] + " ";
}
console.log("OLD: " + allDogs)

// NEW WAY
allDogs = "";
for (let dog of dogs) {
   allDogs += dog + " ";
}
console.log("NEW : " + allDogs);
```

Repetition Practice Problems with for loop

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1. Write a program that takes a command-line argument n and prints a table of the powers of 2 that are less than or equal to 2^n.
2. Write a program that takes a command-line argument n and prints the nth harmonic number. Harmonic Number is of the form

$$H_n = \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \ \ldots \ + \frac{1}{n}$$

3. Write a program that takes a input and determines if the number is a prime.
4. Extend the program to take a range of number as input and output the Prime Numbers in that range.
5. Write a program that computes a factorial of a number taken as input.
   5 Factorial – 5! = 1 * 2 * 3 * 4 * 5
6. Write a program to compute Factors of a number N using prime factorization method.
   Logic -> Traverse till i*i <= N instead of i <= N for efficiency.
   O/P -> Print the prime factors of number N.

while Loop Statement

```
let dogs = ["Bulldog", "Beagle", "Labrador"];

let i = 0;
let allDogs = "";
while (i < dogs.length) {
    allDogs += dogs[i++] + " ";
}
console.log("while: " + allDogs)

i = 0;
allDogs = "";
do {
   allDogs += dogs[i++] + " ";
} while (i < dogs.length)
```

Repetition Practice Problems with while loop

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1. Write a program that takes a command-line argument n and prints a table of the powers of 2 that are less than or equal to 2^n till 256 is reached..
2. Find the Magic Number
   a. Ask the user to think of a number n between 1 to 100
   b. Then check with the user if the number is less then n/2 or greater
   c. Repeat till the Magic Number is reached..
3. Extend the Flip Coin problem till either Heads or Tails wins 11 times.
4. Write a Program where a gambler starts with Rs 100 and places Re 1 bet until he/she goes broke i.e. no more money to gamble or reaches the goal of Rs 200. Keeps track of number of times won and number of bets made.

4. Functions

- Functions are a great way to reuse code.
- Think of a function as a small script within a script. It's a small chunk of code which you may call multiple times within your script. They are particularly useful if you have certain tasks which need to be performed several times.

```
function addNumbers(a, b) {
    return a + b; ;
}
x = addNumbers(1, 2);
```

Demonstrate Functions and Functional Expressions


```
<!DOCTYPE html>
<script>
'use strict';

function askDefault(yes, no, theQue = 'Can you Answer?') {
  if (question(theQue)) yes();
  else no();
}

function ask(theQue, ...others) {
  if (question(theQue)) others[0]()
  else others[1]();
}

function showOk() {
  alert( "You agreed." );
}

function showCancel() {
  alert( "You canceled the execution." );
}

let question = function(theQue) {
    return confirm(theQue);
};

// usage: functions showOk, showCancel are passed as arguments to ask
ask("Do you agree?", showOk, showCancel);
askDefault(showOk, showCancel);
</script>
```

Functions Practice Problems

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1. Help user find degF or degC based on their Conversion Selection. Use Case Statement and ensure that the inputs are within the Freezing Point (0 °C / 32 °F) and the Boiling Point of Water (100 °C / 212 °F)
   a. degF = (degC * 9/5) + 32
   b. degC = (degF – 32) * 5/9
2. Write a function to check if the two numbers are Palindromes
3. Take a number from user and check if the number is a Prime then show that its palindrome is also prime
   a. Write function check if number is Prime
   b. Write function to get the Palindrome.
   c. Check if the Palindrome number is also prime