```
// exercise 1

function drawDiamond(size) {
  // Upper part of the diamond
  for (let i = 0; i < size; i++) {
      console.log(' '.repeat(size - i - 1) + '*'.repeat(2 * i + 1));
  }
  // Lower part of the diamond
  for (let i = size - 2; i >= 0; i--) {
      console.log(' '.repeat(size - i - 1) + '*'.repeat(2 * i + 1));
  }
}

function drawSquare(size) {
  for (let i = 0; i < size; i++) {
      console.log('*'.repeat(size));
  }
}

function drawTriangle(size) {
  for (let i = 1; i <= size; i++) {
      console.log('*'.repeat(i));
  }
}

function getUserInput(promptMsg) {
  while (true) {
      let value = prompt(promptMsg);
      if (!isNaN(value) && value > 0) {
          return parseInt(value);
      } else {
```

```
            alert("Please enter a valid positive number.");
        }
    }
}

function main() {
    let number = getUserInput("Enter a number:");

    console.log("Choose a geometrical figure:");
    console.log("1. Diamond");
    console.log("2. Square");
    console.log("3. Triangle");

    while (true) {
        let choice = prompt("Enter your choice (1/2/3):");

        if (choice === '1') {
            console.log(Drawing a diamond of size ${number}:);
            drawDiamond(number);
            break;
        } else if (choice === '2') {
            console.log(Drawing a square of size ${number}:);
            drawSquare(number);
            break;
        } else if (choice === '3') {
            console.log(Drawing a triangle of size ${number}:);
            drawTriangle(number);
            break;
        } else {
            alert("Please enter a valid choice (1/2/3).");
        }
```

```
  }
}

main();

//exercieses 2

function drawEmptyDiamond(size) {

  for (let i = 0; i < size; i++) {
      if (i === 0 || i === size - 1) {
          console.log(' '.repeat(size - i - 1) + '*'.repeat(2 * i + 1));
      } else {
          console.log(' '.repeat(size - i - 1) + '' + ' '.repeat(2 * i - 1) +
'');
      }
  }

  for (let i = size - 2; i > 0; i--) {
      console.log(' '.repeat(size - i - 1) + '' + ' '.repeat(2 * i - 1) + '');
  }
}

function drawEmptySquare(size) {
  for (let i = 0; i < size; i++) {
      if (i === 0 || i === size - 1) {
          console.log('*'.repeat(size));
      } else {
          console.log('' + ' '.repeat(size - 2) + '');
      }
  }
}
```

```
function drawEmptyTriangle(size) {
  for (let i = 0; i < size; i++) {
      if (i === size - 1) {
          console.log('*'.repeat(i * 2 + 1));
      } else if (i === 0) {
          console.log('*');
      } else {
          console.log('' + ' '.repeat(i * 2 - 1) + '');
      }
  }
}

function getUserInput(promptMsg) {
  while (true) {
      let value = prompt(promptMsg);
      if (!isNaN(value) && value > 0) {
          return parseInt(value);
      } else {
          alert("Please enter a valid positive number.");
      }
  }
}

function main() {
  let number = getUserInput("Enter a number:");

  console.log("Choose a geometrical figure:");
  console.log("1. Empty Diamond");
  console.log("2. Empty Square");
  console.log("3. Empty Triangle");
```

```
  while (true) {
      let choice = prompt("Enter your choice (1/2/3):");

      if (choice === '1') {
          console.log(Drawing an empty diamond of size ${number}:);
          drawEmptyDiamond(number);
          break;
      } else if (choice === '2') {
          console.log(Drawing an empty square of size ${number}:);
          drawEmptySquare(number);
          break;
      } else if (choice === '3') {
          console.log(Drawing an empty triangle of size ${number}:);
          drawEmptyTriangle(number);
          break;
      } else {
          alert("Please enter a valid choice (1/2/3).");
      }
  }
}

main();

//exercises 3

function factorialIterative(number) {
  let result = 1;
  for (let i = 2; i <= number; i++) {
      result *= i;
  }
```

```
  return result;
}


function factorialRecursive(number) {
  if (number <= 1) {
      return 1;
  } else {
      return number * factorialRecursive(number - 1);
  }
}

function getUserInput(promptMsg) {
  while (true) {
      let value = prompt(promptMsg);
      if (!isNaN(value) && value >= 0) {
          return parseInt(value);
      } else {
          alert("Please enter a valid non-negative number.");
      }
  }
}

function main() {
  let number = getUserInput("Enter a number to calculate its factorial:");


  let factorialIter = factorialIterative(number);
  console.log(Factorial of ${number} using iterative method:
${factorialIter});
```

```
  let factorialRec = factorialRecursive(number);
  console.log(Factorial of ${number} using recursive method: ${factorialRec});
}

main();

//exercises 4


function factorial(number) {
  if (number === 0 || number === 1) {
      return 1;
  } else {
      let result = 1;
      for (let i = 2; i <= number; i++) {
          result *= i;
      }
      return result;
  }
}


function calculateLotteryOdds(totalNumbers, chosenNumbers) {
  if (totalNumbers < chosenNumbers) {
      return 0;
  }

  let numerator = factorial(totalNumbers);
  let denominator = factorial(chosenNumbers) * factorial(totalNumbers -
chosenNumbers);
  return numerator / denominator;
}
```

```
function getUserInput(promptMsg) {
  while (true) {
      let value = prompt(promptMsg);
      if (!isNaN(value) && value > 0) {
          return parseInt(value);
      } else {
          alert("Please enter a valid positive number.");
      }
  }
}

function main() {
  let totalNumbers = getUserInput("Enter the total number of possible numbers in the lottery:");
  let chosenNumbers = getUserInput("Enter the number of numbers chosen in the lottery ticket:");

  let odds = calculateLotteryOdds(totalNumbers, chosenNumbers);
  console.log(The odds of winning the lottery are approximately 1 in ${odds.toFixed(0)} chance.);
}

main();

//exercises 5

function calculateSumRecursive(number) {
  if (number === 1) {
      return 1;
  } else {
```

```
        return number + calculateSumRecursive(number - 1);
    }
}

function getUserInput(promptMsg) {
    while (true) {
        let value = prompt(promptMsg);
        if (!isNaN(value) && value > 0) {
            return parseInt(value);
        } else {
            alert("Please enter a valid positive number.");
        }
    }
}

function main() {
    let number = getUserInput("Enter a number to calculate the sum from 1 to
that number recursively:");

    let sum = calculateSumRecursive(number);
    console.log(The sum from 1 to ${number} is: ${sum});
}

main();


//exercises 6


function countDigitsRecursive(number) {
    if (number < 10) {
        return 1;
```

```
  } else {
      return 1 + countDigitsRecursive(Math.floor(number / 10));
  }
}

function getUserInput(promptMsg) {
  while (true) {
      let value = prompt(promptMsg);
      if (!isNaN(value) && value >= 0) {
          return parseInt(value);
      } else {
          alert("Please enter a valid non-negative number.");
      }
  }
}

function main() {
  let number = getUserInput("Enter a number to calculate the number of
digits:");

  let numDigits = countDigitsRecursive(number);
  console.log(The number of digits in ${number} is: ${numDigits});
}

main();

//exercises 7

function reverseNumber(number) {
  let reversed = 0;
  while (number > 0) {
      let digit = number % 10;
```

```
        reversed = (reversed * 10) + digit;
        number = Math.floor(number / 10);
    }
    return reversed;
}

function getUserInput(promptMsg) {
    while (true) {
        let value = prompt(promptMsg);
        if (!isNaN(value) && Number.isInteger(parseFloat(value)) && value >= 0)
{
            return parseInt(value);
        } else {
            alert("Please enter a valid non-negative integer number.");
        }
    }
}

function main() {
    let number = getUserInput("Enter a number to print it in reverse order:");

    let reversedNumber = reverseNumber(number);
    console.log(The number ${number} in reverse order is: ${reversedNumber});
}

main();
```