CSE216
Foundations of Computer Science

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Exercise 1: Hello World

- Task: Write a program that prints "Hello, World!" followed by a new line.

Exercise 2: Debugging Type Error

- Try combining x and y using the ^ operator. What error do you see? Choose your own x and y

- Debug and make things right

Exercise 3: Basic Arithmetic

- Do research on the Taylor expansion of e^x around x = 0

- Write a function **taylor** that computes e^x using the first three items of the Taylor expansion

- Calculate e^x at x = 0.1 with the function taylor. Expected result is 1.105

Exercise 4: Functions with multiple arguments

- Important note: Define a function with “let function_name function_parameters = …”

- Write a function **sum** that takes two integers as arguments and returns their sum.

- Write a function average that takes two float values and returns their average.

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Exercise 5: Basic Recursion

- Important note: Define a recursive function with “let rec function_name function_parameters = …”

- Write a recursive function **factorial** to calculate the factorial of a number.

- Test Input: 5

- Expected Output: 120

```
let rec factorial n = if n=1 then 1 else n * factorial(n-1);;
```

Exercise 6: Conditional Statements

- Write a function **maximum** that takes three integers and returns the largest of them.

$3^3 = 3^1 \cdot 3^2$

a b c

```
if (a >b) && (a>c)
    return a;
else
    return c;
else if (b > c) && (b>a)
    return b;
else
    return c;
```

$f(a) = x^n$

```
let rec exp x n = ...
```

$$f(x) = \begin{cases} 1 & n = 0 \\ x \cdot x^{n-1} & n > 0 \end{cases}$$

```
let maximum a b c
= if a>b then if a>c then a else c
  else if b>c then b else c;;
=> if a>b && a>c then a
  else if b>a && b>c then b
  else c;;
```