National University of Singapore
School of Computing
CS1101S: Programming Methodology
Semester I, 2022/2023

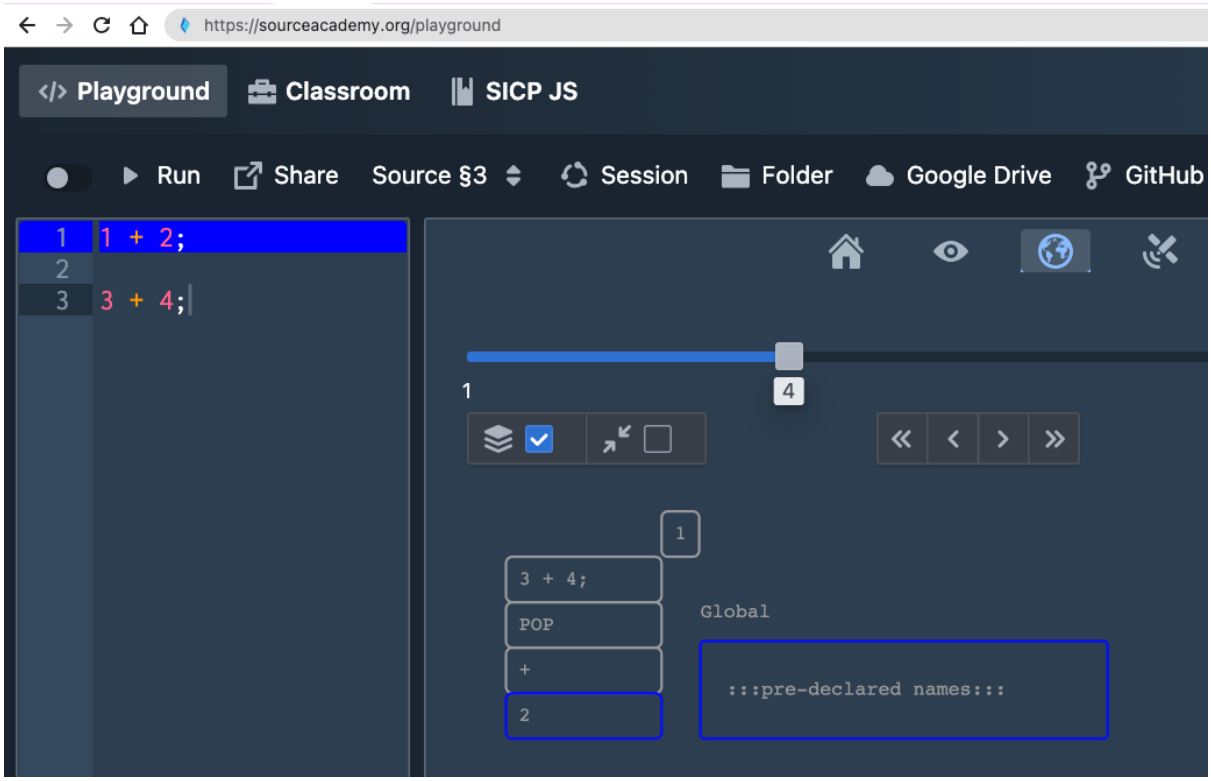
R9B
Extended Environment Model

Problems:

1. What is the result of executing the following program?

```
1 + 2;
3 * 4;
```

Use the Extended Environment Vizualizer to explain. You get this tool by going to https://sourceacademy.org and go to Source §3. Then you click on the "Environment Visualizer":



Make sure to "Enable Agenda and Stash".

2. Explain the following program using the EEV tool:

```
{
  const x = 3 * 4;
  const y = x + 2;
  x * y;
}
```

3. Explain how the factorial function works, using EEV:

```
function fact(n) {
  return n === 1
  ? 1
  : n * fact(n - 1);
}
fact(4);
```

4. How does the Extended Environment Model get back to the previous environment? Explain this using the following examples from the lecture. Use the EEV tool:

```
const x = 1;
{
   const x = 42;
   display(x);
}
```

and

```
const n = 42;
function fact(n) {
  return n === 1
  ? 1
  : fact(n - 1) * n;
}
fact(4) + n;
```

5. How is the Extended Environment Model able to ignore parts of functions that are not executed, because a return statement returns to the function caller? Use the EEV tool on this example:

```
function f(b, x) {
   if (b) {
   return x + 1;
   }
   x - 1;
}
f(false, 11);
```