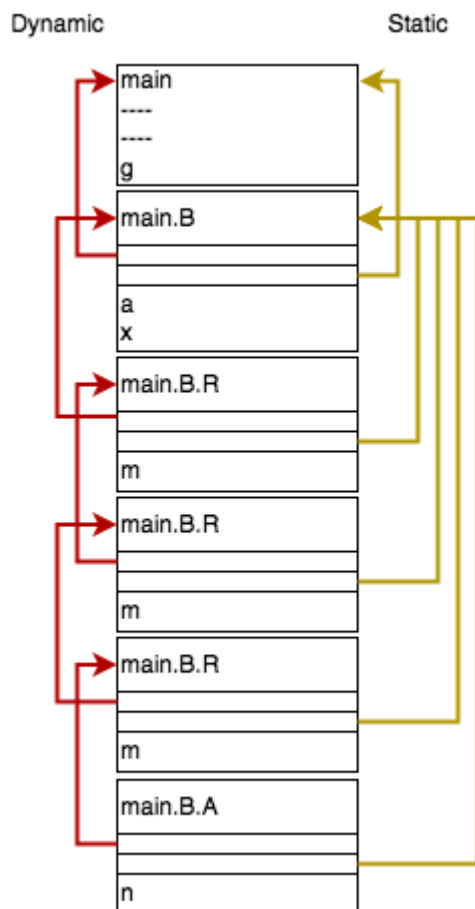# Problem 1

a)

```
9423
```

b)

c)

```
The program is static scoping, so when searching variables,
1) It will search local variable g first. However, there isn't one.
2) Then it will try following the static link to precedure B. In scope of B, there
is still no variable g.
3) Finally, we continue following the static link to main, which we find g here.
```

Problem 2

a)

Production	Semantic Rule
E -> O E1 E2	E.val = '(' + E1.val + O.val + E2.val + ')'
E -> -E1	E.val = '(' + '-' + E1.val + ')'
E -> id	E.val = id.val
O -> *	O.val = '*'
O -> +	O.val = '+'

b)

Productions -> List of Semantic Rules

- `E -> id`

  - `E.pri = 4`
  - `E.val = id.val`

- `E -> -E1`

  - `E.pri = 3`

  - ```
    if E1.pri < E.pri:
        E.val = '-' + '(' + E1.val + ')'
    else:
        E.val = E1.val
    ```

- `E -> O E1 E2`

  - `E.pri = O.pri`

  - ```
    if E2.pri <= E.pri:
        if E1.pri >= E.pri:
            E.val = E1.val + O.val + '(' + E2.val + ')'
        else:
            E.val = '(' + E1.val + ')' + O.val + '(' + E2.val + ')'
    else:
        if E1.pri < E.pri:
            E.val = '(' + E1.val + ')' + O.val + E2.val
        else:
            E.val = E1.val + O.val + E2.val
    ```

- `O -> *`

  - `O.val = '*'`
  - `O.pri = 2`

- `O -> +`

  - `O.val = '+'`
  - `O.pri = 1`