COMPUTE 2024 - IIT Gandhinagar
SimpliPy: A Notional Machine for learning Python
Worksheet 1

December 05, 2024

ID: _____

Workshop Instructions

1. On **all** your worksheets, please write as your ID, the token number given to you.

2. *Please do **not** write your name or any other personal identification information anywhere on this sheet or any of the worksheets or the feedback form.*

3. At the end of the workshop, you will be asked to complete an online feedback form.

4. Make sure you write the same ID assigned to you on all your worksheets and the feedback form.

Consent to use your work for academic research

The authors are engaged in research related to novel ways of understanding programs. These worksheets are designed with the above research focus. Your worksheet submissions and survey responses help us further this research. Your worksheets and feedback information are available only to the authors. All data will be kept in an anonymous manner and aggregated. No personal information will be collected, used, or shared elsewhere.

If you do not wish to allow the use of your data in this research, please tick the "NO" box below. In that case the data from your worksheets will not be used as part of the research. Otherwise, please tick "YES".

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Worksheet Format

This worksheet includes a SimpliPy program. Please generate the following artefacts for it:

1. **Control Transfer Functions**

2. **Control Flow Graph**

3. **Execution Diagram**

Program

```
0
  x = 2
1
  pass
2
  y = x * 2
3
  pass
4
  z = y - x
5
```

1 Control Transfer Functions

Fill out the provided table of Control Transfer Functions with the appropriate locations.

Loc	next	err
0		
1		
2		
3		
4		
5		

2 Control Flow Graph

Construct a Control Flow Graph for the program.

- **Create nodes:** Represent each location as a node in the graph.

- **Draw directed edges:** Connect nodes with directed edges to show **possible** transitions from one location to another.

- **Label the edges:** Label each edge with the control transfer function used in the transition represented by the edge.

Note: For brevity, exclude the error edges.

L_0

L_1

L_2

L_3

L_4

L_5

3 Execution Diagram

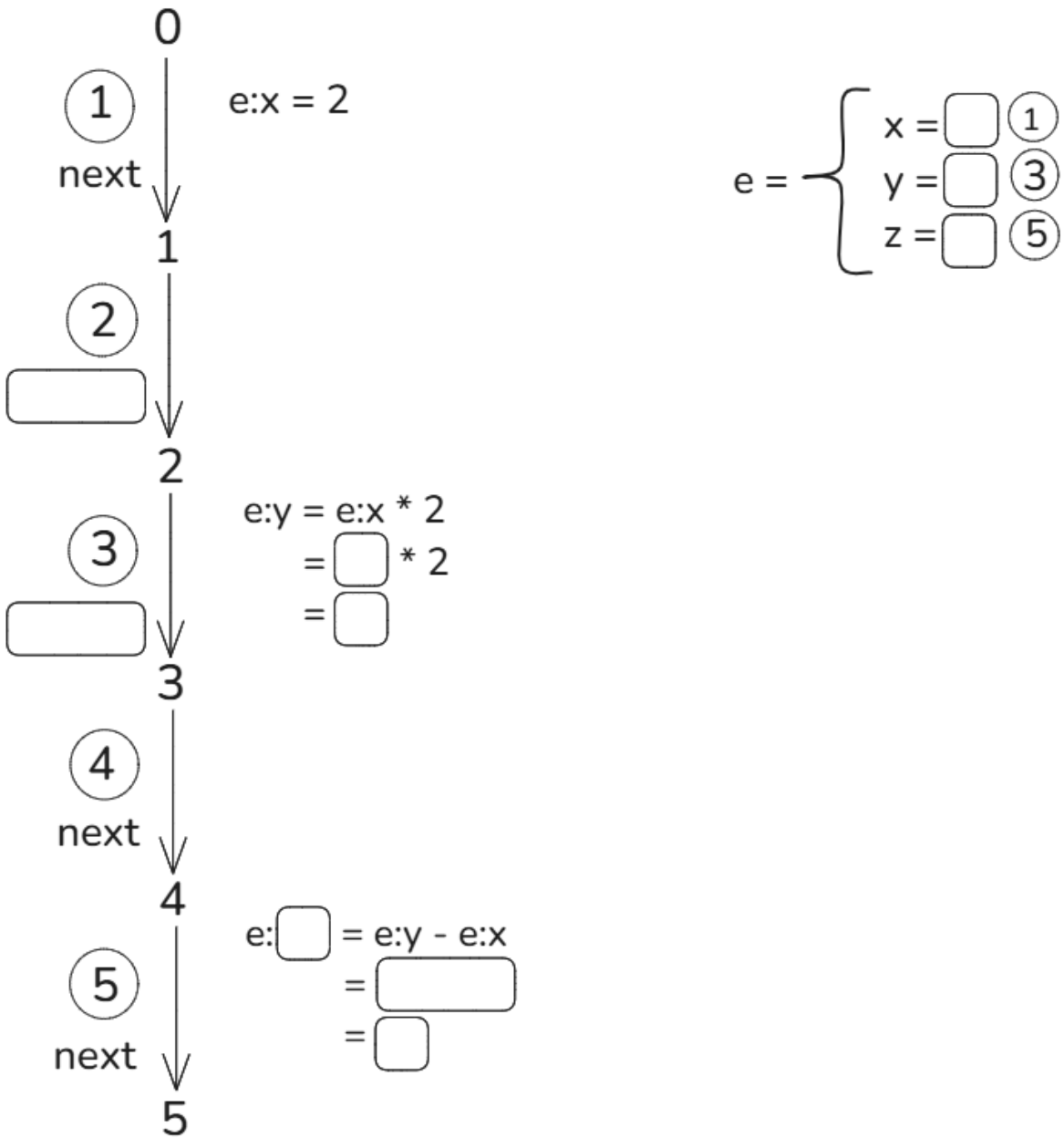Complete the Execution Diagram representing the program's execution.

- **Label the edges:** Fill the blank edges with the following:
    - the control transfer function used in the transition.
    - the update event, if any.

- **Update the environment:**
    - Update the maps of identifiers to values.
    - In case of reassignments, strike out the old map and write the new map.
    - Beside each map, mention the step number at which the update event occurs.

Program

```
0
  x = 2
1
  pass
2
  y = x * 2
3
  pass
4
  z = y - x
5
```

0

(1)

next

e:x = 2

1

(2)

[ ]

2

(3)

[ ]

e:y = e:x * 2

= [ ] * 2

= [ ]

3

(4)

next

4

(5)

next

5

$e = \begin{cases} x = [\ ] \ (1) \\ y = [\ ] \ (3) \\ z = [\ ] \ (5) \end{cases}$

e:[ ] = e:y - e:x

= [ ]

= [ ]

Space for Rough Work