

Week 02

Object & Class



Department of Software Engineering-FIT-VNU-HCMUS

1

Notes

Create a single solution/folder to store your source code in a week.

Then, create a project/sub-folder to store your source code of each assignment.

The source code in an assignment should have at least 3 files:

- A header file (.h): struct definition, function prototypes/definition.
- A source file (.cpp): function implementation.
- Another source file (.cpp): named YourID_Ex01.cpp, main function. Replace 01 by id of an assignment.

Make sure your source code was built correctly. Use many test cases to check your code before submitting to Moodle.

2

Content

In this lab, we will review the following topics:

- Class diagram
- Implement classes, attributes and methods in C++.

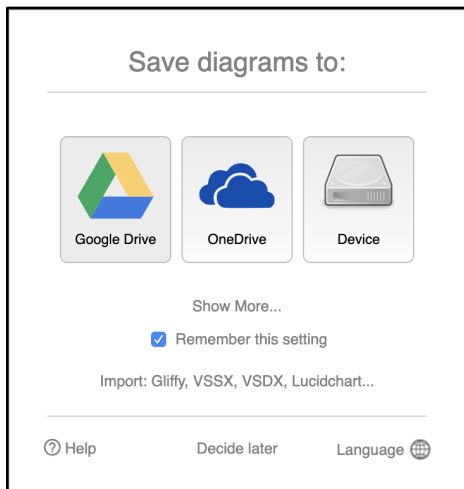
3

Basic class diagram creation in draw.io

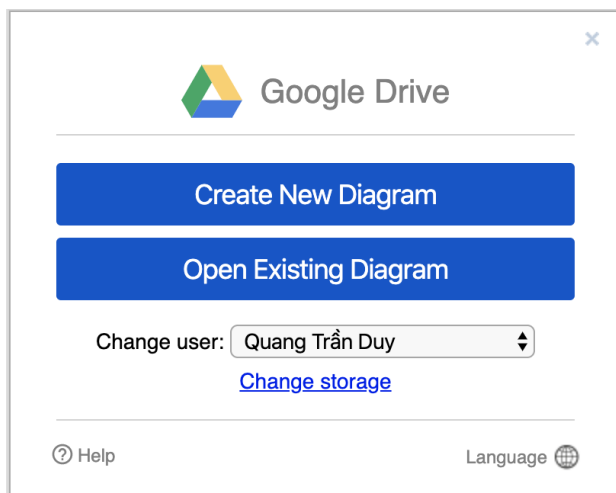
(Credit to Mr. Trần Duy Quang)

Using draw.io to create class diagram

- **Step 01:** Access <http://draw.io>, choose to save your diagrams using Google Drive (recommended).



- **Step 02:** Choose **Create new diagram** to create a blank diagram.



- Step 03: Create a Blank diagram, name it in the following format:




Diagram Name:

Basic (1)

Business (14)

Charts (5)

Cloud (41)

Engineering (3)

Flowcharts (9)

Layout (4)

Maps (5)

Network (13)

Other (11)

Software (8)

Tables (4)

UML (8)

Venn (8)

Blank Diagram

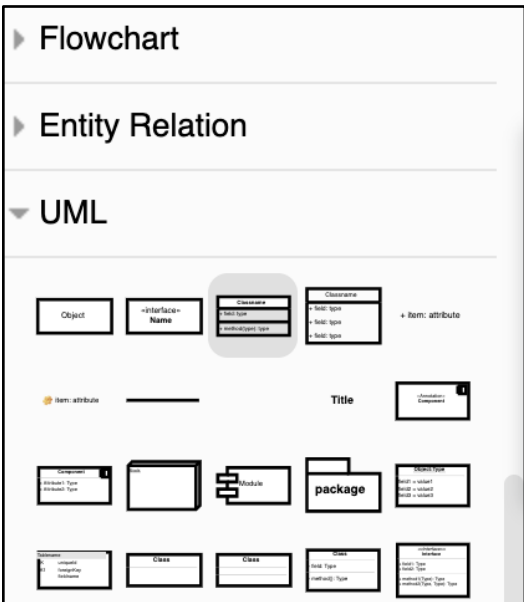
Help

Cancel

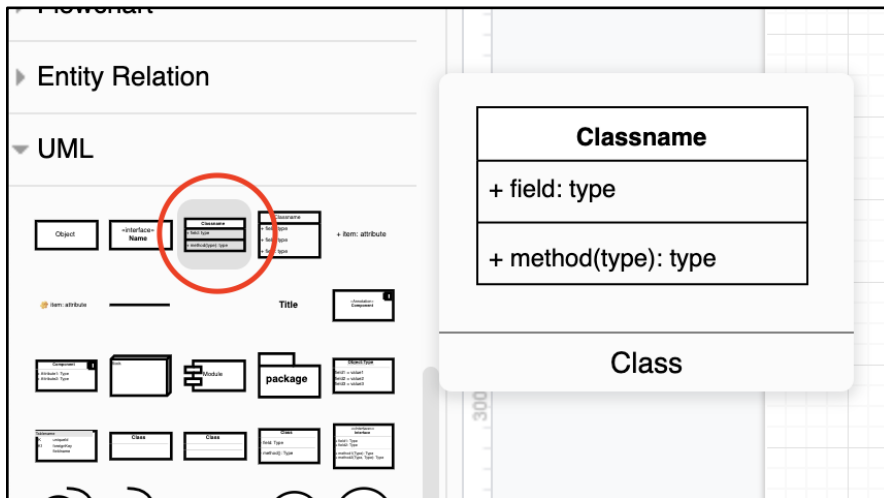
From Template URL

Create

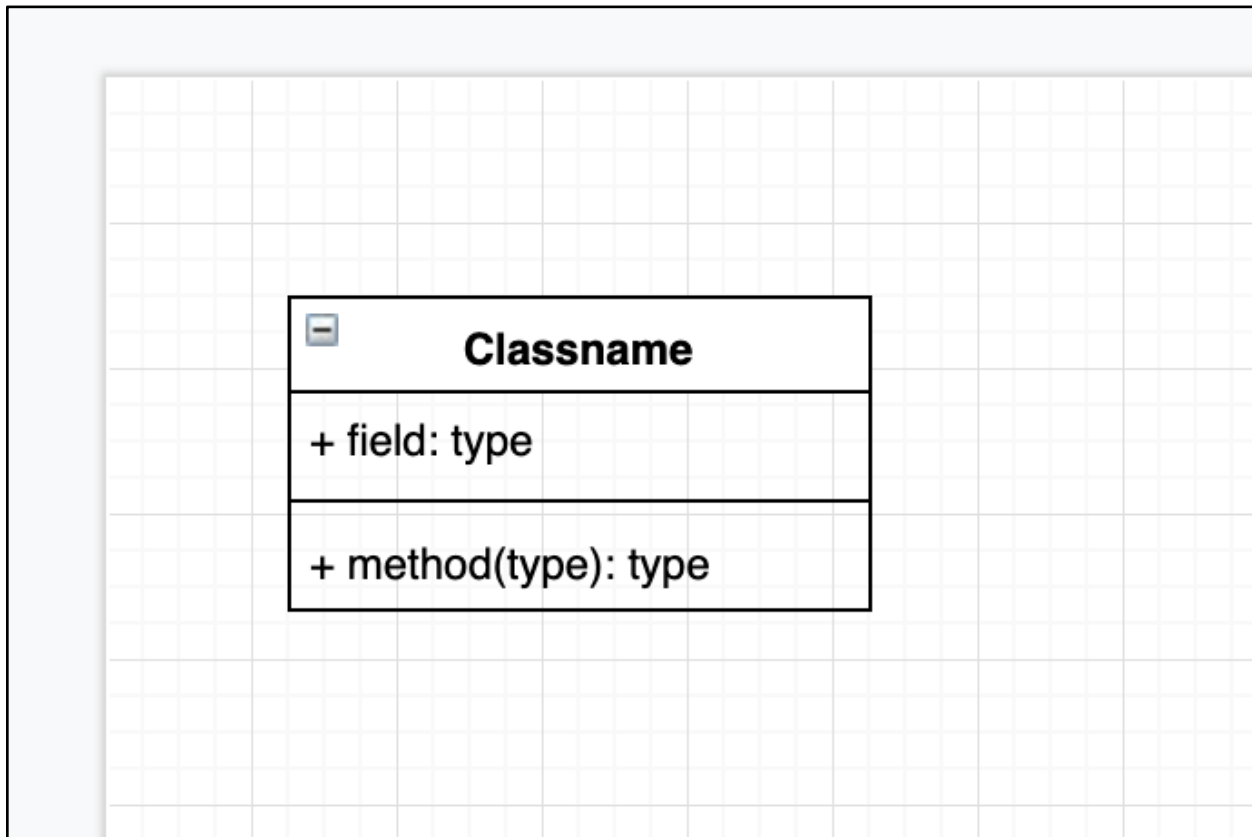
- **Step 04:** On the left panel, expand the UML node for all the shapes needed for creating class diagram



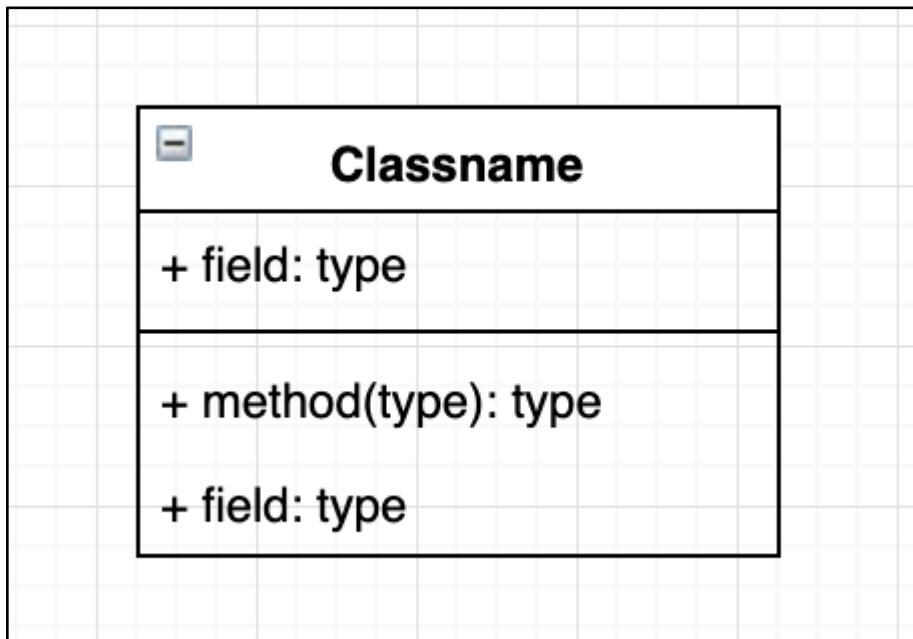
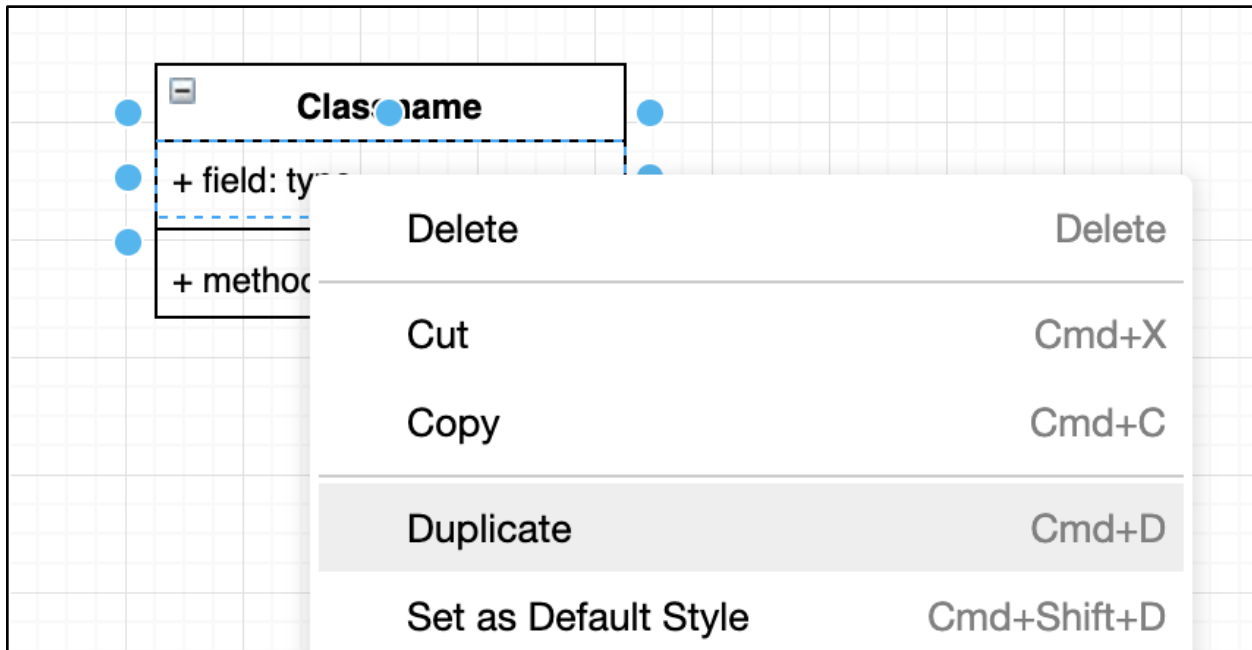
- **Step 05:** Create your first class diagram by choosing class



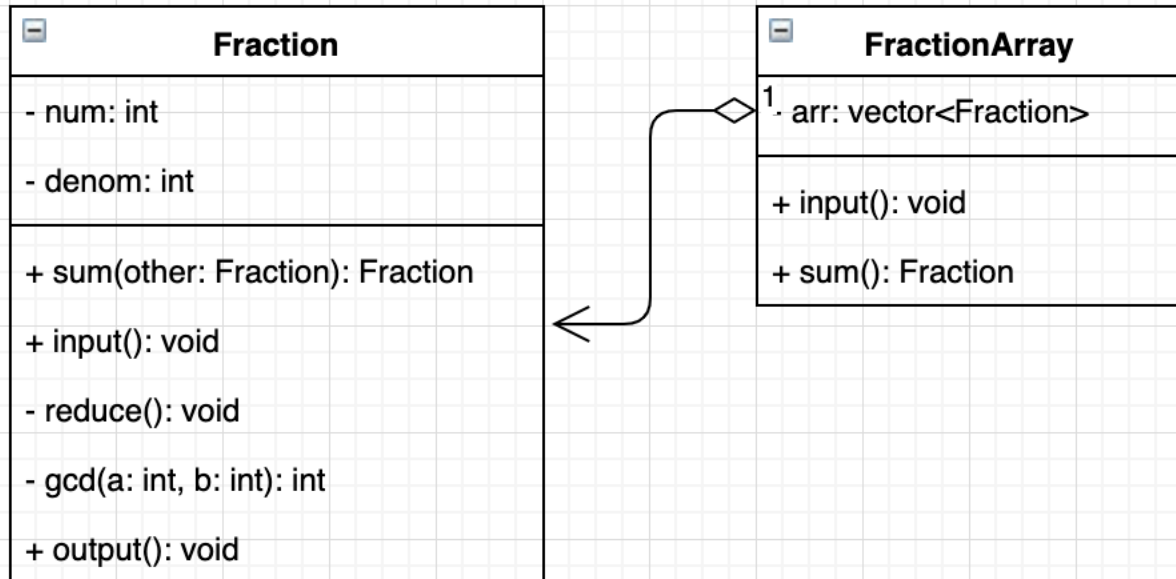
This is the default result you will see:



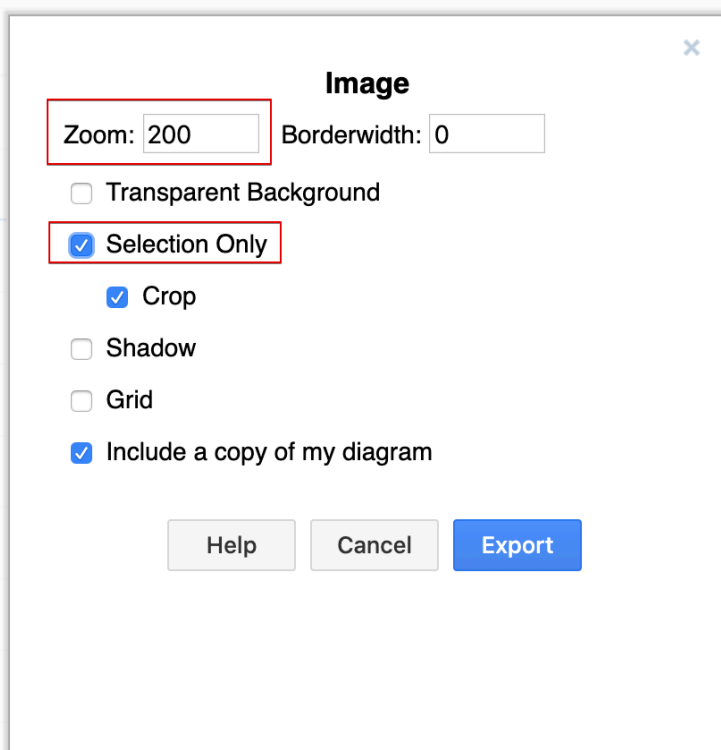
- **Step 06:** To create new attribute field, right click and choose Duplicate, then drag it into attribute section (the middle one)

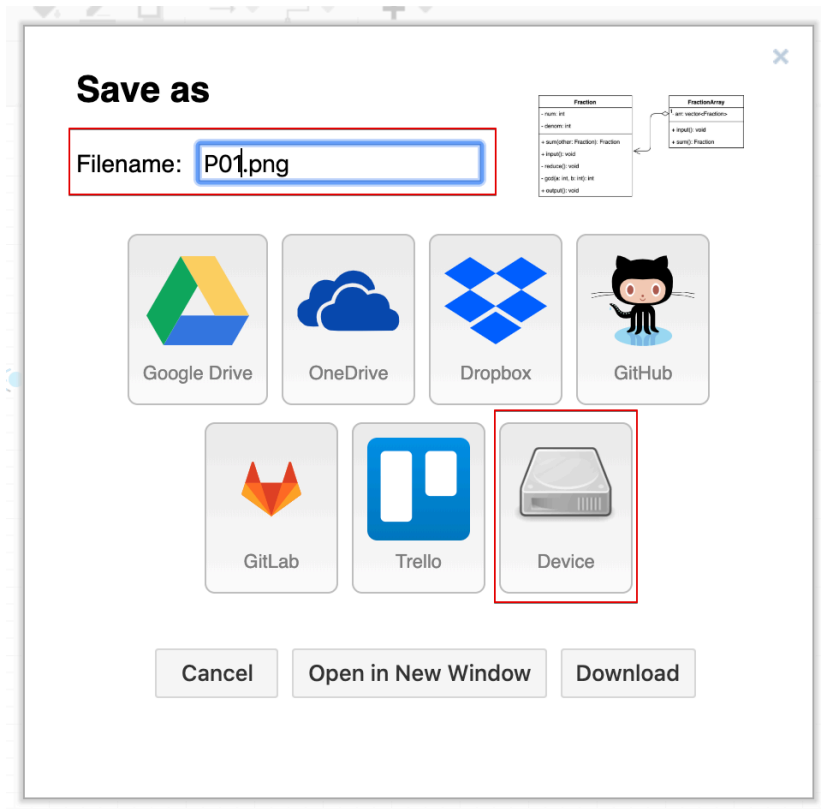


- **Step 6:** Here is a class diagram



- **Step 7:** To submit your work. Firstly, drag and select your diagram. Secondly, choose menu File – Export as – PNG. Thirdly, Zoom: 200%, Selection Only. Export. Finally, choose your local device and download.





4 Assignments

A: YY: 01

H: YY: 03

Draw class diagrams and implement the following assignments in C++ language. Remember to export class diagrams to image files.

3.1. Fraction

Class: Fraction

Attributes:

1. Numerator
2. Denominator

Methods:

1. Input
2. Output
3. Add 2 fractions
4. Subtract 2 fractions
5. Multiply 2 fractions
6. Divide 2 fractions. throw; if divided by zero
7. Reduce
8. Compare
9. IsPositive
10. IsNegative
11. IsZero

3.2. Triangle

Class Point.

Attributes:

1. x
2. y

Methods:

1. Input
2. Output
3. Distance from point A to point B
4. Distance to Ox
5. Distance to Oy

Class: Triangle

Attributes:

1. Point A
2. Point B
3. Point C

Methods:

1. Input
2. Output
3. IsValidTriangle
4. Type of a triangle.
 - a. <https://www.dkfindout.com/us/math/geometry/types-triangle/>
5. Perimeter
6. Area
7. Center G

3.3. Queue / LinkedList

Class: LinkedListQueue

Attributes:

1. Node *head
2. Node *tail
3. int capacity: max number of elements in the queue
4. int num: current number of elements in the queue

Methods:

1. init(int capacity)
2. enqueue(x) / push(x)
3. int x = dequeue()
4. peek(): return the top element but do not enqueue
5. isEmpty
6. isFull
7. clear