Tutorial 2
Introduction to Classes and Objects

Objectives

After completing this tutorial, you should be able to

- define classes and creating objects
- separating class specifications and implementations into files

Tutorial Materials

- Program templates are provided for this tutorial. Please download from the elearning and extract the ZIP file to your local drive.
- The questions and tasks to be completed are stated in the program templates.
- Code snippets will be provided for selected tasks during the tutorial session on the projector screen and the online "paste board" (please refer to elearning for the link)

Program 1: Defining Classes and Creating Objects

In this tutorial, you will be using the OOP approach to write a program that displays a circle moving from one side of the screen to the other side and bouncing back when it reaches the border. The program is written is a single .cpp file.

Notes: use the Debug : "WinBGI Program" to run this program.

Open the folder "student_copy" into VS Code.

Complete the **program1.cpp** which defines a class named Circle. The class should have member variables (attributes) and member functions (methods) as follows:

Attributes:

- center coordinates (x, and y),
- radius
- color

Methods:

- A constructor
- Accessors (or getters). One method for each attribute, e.g. `getX()`, `getY()`
- Mutators (or setters). One method for each attribute. e.g., `setX()`, `setY()`
- Methods about displaying the circle, e.g., `draw()`, `undraw()`

The remaining questions or tasks are stated in **program1.cpp**.

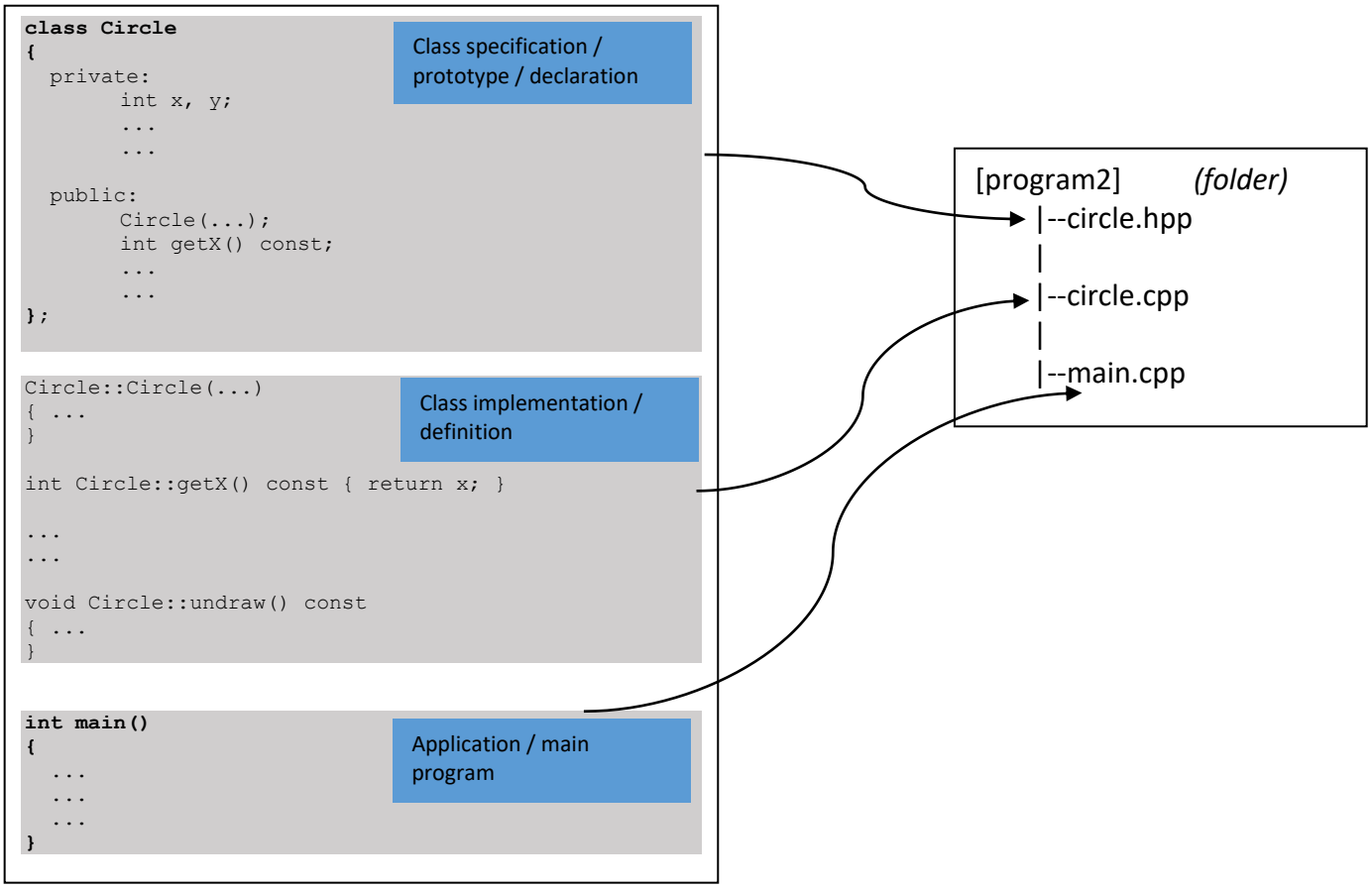
Program 2: Class Specification and Implementation using Separated Files

In this tutorial, you will be rearranging program1.cpp into several files. One of the reason of splitting a program into several files is that to make it easier to maintain. By using this approach, your program now no longer resides in a single .cpp file. Instead, you will be using a folder for each program.

Notes: use the Debug : "Multi-file WinBGIm Project" to run this program.

1. Open the folder "**program2**" into VS Code (the folder is inside another folder "student_copy").
2. Create three new files under the folder. (You can do this inside the VSCode)
    - **circle.hpp** (class header or specification or prototype or class declaration file)
    - **circle.cpp** (class body or implementation or class definition file)
    - **main.cpp** (application or main program file)

3. Copy code segment from your program1.cpp and paste them into the newly created files, as follows (also shown in the following figure):
    - Class specification goes to **circle.hpp**
    - Class definition goes to **circle.hpp**
    - The main function goes to **main.cpp**



4. In files **circle.cpp** and **main.cpp**, include the header "circle.hpp" so that the compiler can recognize the class `Circle`.

5. Run the program. You should get the same result as in program1.cpp