2021 Winter CIS200 – Lab 10

Release date: April 3, 2021

Due date: April 14, 2021

# Dynamic binding (i.e., polymorphism) is one corner stone of the object-oriented programming. In C++, we rely on virtual functions and pointers to a base class and its derived classes to implement the polymorphism.

# **Question 1 (30 points) Polymorphism**

Write a program that uses inheritance and polymorphism. Make a Pet class and let it have a kind of food (string). You have a feed() function and a speak() function. Both functions should be virtual functions.

Child classes will have different things depending on what it is. Inside the four child classes, you should override the feed( ) and speak( ) functions to generate the specified output.

Below is the main() function of your program:

int main() {

Pet \*nick, \*jeff, \*chris, \*sam;

nick = new Cat("Meow Mix", "red");

jeff = new Monkey("Banana", true);

chris = new Lizard("Flies", 5);

sam = new Turtle("Lettuce", 0.5);

nick->feed(); jeff->feed(); chris->feed();

sam->feed();

nick->speak(); jeff->speak(); chris->speak();

sam->speak();

return 0;

}

The output of the program:

Got a red cat

Got a monkey with a tail

Got a lizard with a 5cm tongue

Got a 0.5-pound turtle

Eats Meow Mix

Eats Banana

Eats Flies

Eats Lettuce

Meow!

\*Scratches pit\*

Grrrrrrr~

\*Turtle noise\*

# **Question 2 CRC Card**

In this question, design a CRC model for all the classes in Question 1. Show five CRC cards, which correspond to the Pet, Cat, Monkey, Lizard, and Turtle classes. Use “super classes” and “subclasses” to represent the inheritance relationship between these five classes.

# **Question 3 Software Modifiability**

Write a half-page summary about Software Modifiability based on your Internet search.

# **Question 4 Programming Ethics**

Write a half-page summary about Programming Ethics based on your Internet search.

**Submission of Your Work:**

The Word document should contain the following information

* Your name
* Machine type (Unix, Mac, Linux or PC machine ?)
* Compiler type
* Description of your code design and implementation
* Inclusion of your source
* A reasonable number of comment lines in your source code
* Screen shot of your test run (required)