1.

(a) I talked with Safwan and he helped me to figure out question number 6 part c.

(b) I acknowledge this.

2.

program scopes (input, output);

var a : integer;

procedure first;

begin a := 1; end;

procedure second;

var a : integer;

begin first; end;

begin

a := 2; second; write(a);

end.

the creation is at the line 2 but without assign any value

at the second line from bottom assign a to 2 and call procedure second

in the procedure second, create the stack variable a then call procedure first

in procedure first assign a to 1 and return to procedure second

in procedure second, the stack variable a is 1 and after end, it destructed.

Back to the return from procedure second, the global a still is 2 and after write(a) and end of the program, the global a is destroyed.

3. because the goto statement is too powerful and very hard to read and the most important rule to write the code is make it as simple as possible, so that people have to introduce various iteration to get rid of goto statement in program.

4.

For value model:

A screenshot of a social media post

Description automatically generated

After call the function double\_it, the primitive variable num’s value still 1.

For reference model:

A screenshot of a social media post

Description automatically generated

After call the function double\_it, the class object o’s integer num’s value became 2.

5.

The first issue is breaking the iteration when needed because in program it always needs to break the loop when some condition meet. For example, the break in java or C language.

The second issue is skipping the certain loop and continue to loop the rest of the iteration, for example, the continue in java or C language.

6.

(a) A strongly-typed programming language is one in which each type of data (such as integer, character, hexadecimal, packed decimal, and so forth) is predefined as part of the programming language and all constants or variables defined for a given program must be described with one of the data types. Certain operations may be allowable only with certain data types. The language compiler enforces the data typing and use compliance. An advantage of strong data typing is that it imposes a rigorous set of rules on a programmer and thus guarantees a certain consistency of results.

(b)

1.set point of view

2.abstraction point of view

3.constructive point of view

(c)

The set of values represented by colortype is 3 different color (use integer to identify) and in C language it equals:

typedef int colorType;

const colorType red = 0, blue = 1, green = 2;

the set of values represented by ObjectType is the combination of one integer and one colorType (red, blue, green)

(d)

In C: one allows an array of object of arbitrary types.

(e)

1.structural equivalence

2.name equivalence

7.

From the last line of the program, we know that the input of fib\_helper is 0,1. so the f1 and f2 are integers. Also, the third line from the bottom which (i+1), it tells that the output j is also an integer.

The type of finb\_helper is that given integers input f1 and f2, it returns an integer i.

In C it can be written: int finb\_helper(int f1, int f2)