1.  In many programming languages, the operands of an addition are actually memory locations, and the result of an addition is stored in the same location as one of the operands, so the operation is not commutative. A+B may not give quite the same result as B+A, because of the storage location of the result.

2. Consider the integer expression A + B + C. Suppose the values of A, B, and C are 20,000, 25,000, and -20,000, respectively. Further suppose that the machine has a maximum integer value of 32,767. If the first addition is computed first, it will result in overflow. If the second addition is done first, the whole expression can be correctly computed.

3a. operands evaluated left to right:   7

3b. operands evaluated right to left: 12

4.

-Each subprogram has a single entry point.

-The calling program unit is suspended during the execution of the called subprogram, which implies that there is only one subprogram in execution at any given time.

-Control always returns to the caller when the subprogram execution terminates.

5.

|  |  |
| --- | --- |
| advantage | disadvantage |
| Allows recursion | Run time overhead for allocation and deallocation |
| Conserves storage | Subprogram cannot be history sensitive |
|  | Inefficient references |
|  | Limited by stack size |
|  |  |
|  |  |
|  |  |
|  |  |

6. The environment of the call statement that enacts the passed subprogram is the environment for the passing subprogram. This is called shallow binding. The environment of the definition of the passed subprogram is the environment of the passing subprogram. This is called deep binding.

7a. With pass by value, none of the actual arguments are changed, so the variables retain the values they were initialized with.

7b. With pass by reference, the arguments are changed. After the first call to swap, value == 1 and list[0] == 2. After the second call to swap, list[0] == 3 and list[1] == 2. After the third call, value == 2 and list[1] == 1.

7c. same as reference

8a. Passed by value

In passed by value, the argument value does not change so it will be

list [2] = {1, 3};

8b. Passed by reference

In passed by reference, the argument value changes so it will be

list [2] = {2, 6};

8c. Passed by value-result

It will be similar to passed by reference in this situation, so it will be

list [2] = {2,6};