Lecture 3

* Constants operations and evaluations are done by compiler
* Operations involving variable operand are computed at runtime. Namely, the compiler will generate instructions to do the operations at runtime.
* Arithmetic operations of the same type results in the same type for example int/int = int
* Operations of different data types require type conversion

Float b = 2.6;

Int a = b; (implicit casting, conversion at runtime, a will have value 2)

Int a = (int) b; (explicit casting, conversion at runtime, a value 2)

* When casting, values are FLOORED i.e., 4.99 will become 4 as an int
* Overflow: data type out of range after the operation
* Underflow: happens when operation produces a result smaller than the smallest floating number
* Correctness of operation computing: In general, there is a precision loss for each float or double operations. Computing for other types are precise if there isn’t an overflow.

Int a = !(3==3); // a gets value 0

Int a = 2&&3; // a gets value 1

**Bitwise operations**

* & AND
* | OR
* ^ XOR
* ~ one’s complement
* << Shift left ex. C = a<<2; same as c = a\*4;
* >> Shift right
* Bitwise operations is a fast primitive operation directly supported by the processor

**Unary Operators**

Int j=i++ same as int j=I;i=i+1;

Int j = ++I same as i=i+1;int j=I;

**Conditional (ternary) Operator**

Boolean\_statement ? val\_if\_true:val\_if\_false

Ex.

Int a =1>2?10:20; //a has value 20

**Shorthand assignment operators**

* &= same as variable = variable & expression

**Flow controls**

* Three flow control constructs:
  + Sequence
  + Selection/decision control
  + Repetition
* Special control statements
  + Break
  + Continue
  + Goto

1. Sequence linear order

Int a = 10;

Char c = ‘a’;

1. Decision (selection, branching)

If()

Else()

switch

* If an if statement only has one line curly braces are not required

1. Repetition

* For loop
* While loop
* Do-while

**Goto statement**

* Syntax:

Label a;

Goto a;

* Flow will jump from the goto statement to the label