CS 101 Computer Programming and Utilization

Lecture 4
Expressions and Control Flow

Wed Jan 19, 11:05-12:30
Fri Jan 21 2:00-3:25

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Revision: Variables, Values, Assignment Statement, Types

- Objects used inside a program
- Variables: some of the identifiers
- Assignment
- Lvalue and rvalue
- Expressions and variables
- Storage space
- Types
- Variable declarations
- Initialization
- Determining size requirement of variables
- Checking for types during assignment
- Standard data types and their sizes

Decimal Numbers

- Numbers to the base 10
  - Decimal system
  - Use of just 10 digits digits 0,1,2,...9
  - Example: 7 3 5 6
  - We have used 4 symbols 7,3,5,6
  - We have placed them in a sequence
  - Each place has a different value weightage

    = 7000 + 3000 + 50 + 6

    i.e. $7*10^3 + 3*10^2 + 5*10^1 + 6*10^0$

Binary Numbers

- Numbers to the base 2
  - Binary system
  - Use of just 2 digits digits 0,1
  - Example: 1 0 1 1
  - We have used 4 symbols in total
  - We have placed them in a sequence
  - Each place has a different value weightage

    = 8 + 0 + 2 + 1

    i.e. $1*2^3 + 0*2^2 + 1*2^1 + 0*2^0$

Storage required for a variable

- Char c
  - 8 bits kept aside for ever char
  - How many characters can we accommodate all in all?
    - 2^8
- int x
  - 4 bytes kept aside for every integer
  - i.e. 32 bits
  - -2147483648 to +2147483647
- Unsigned int
  - 4 bytes kept aside
  - 0 to 4294967295

Expressions

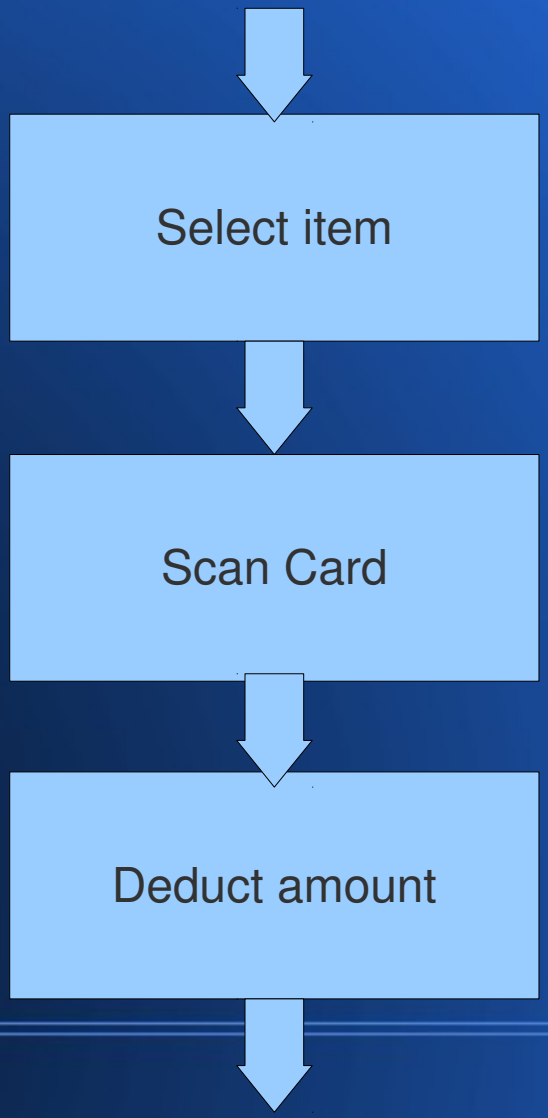
- a+b a = b
- (a+b) (a==b)
- A-b a < b
- a*b a > b
- a/b a <= b
- a%b a >= b

Operator Precedence

a + b * c is equivalent to (a + (b * c))

- Brackets can be omitted if we write expressions considering the precedence rules

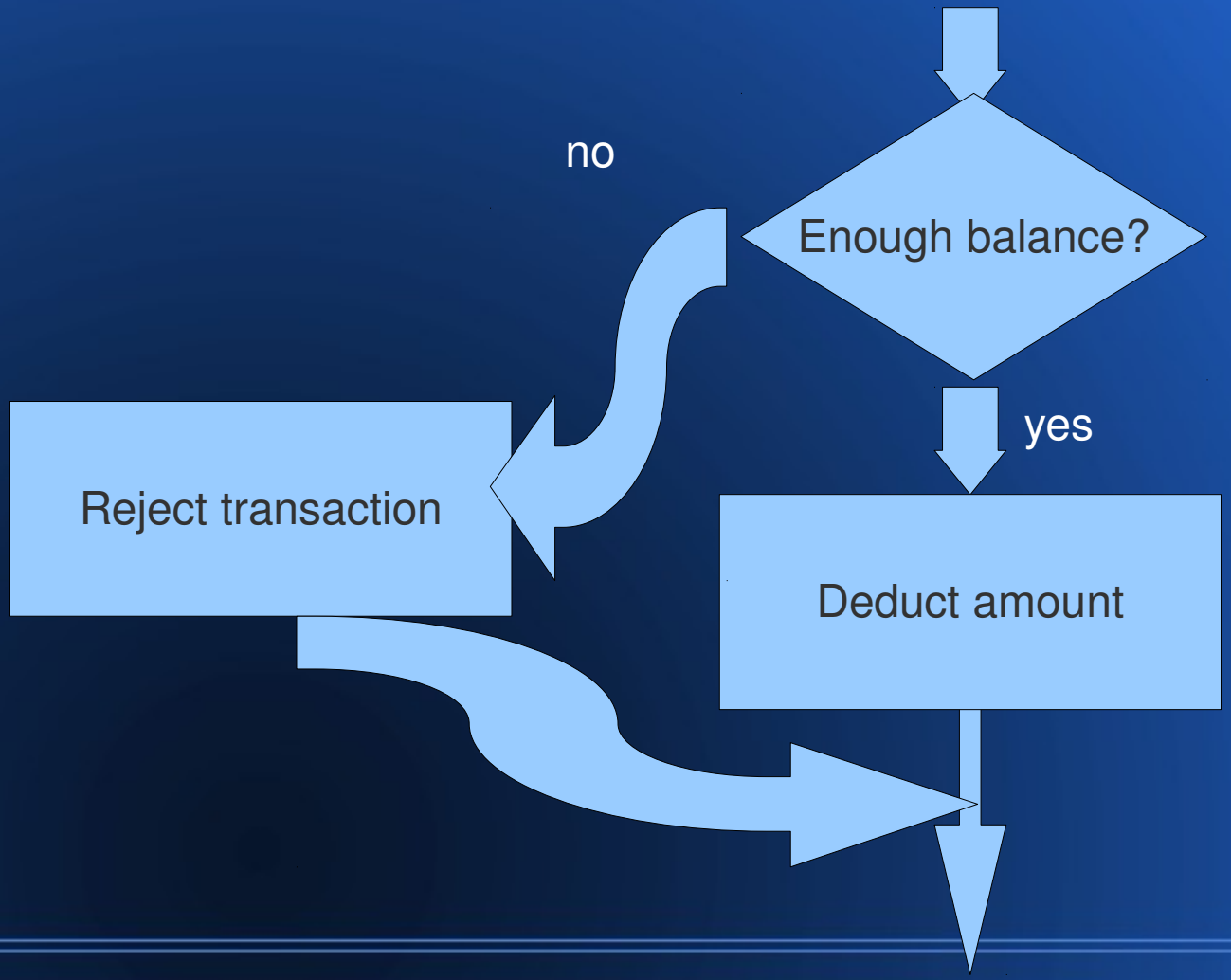
Sequential Control



Sequential control

```
int main () {
    cin >> x;
    cin >> y;
    cout << x + y;
}
```

Conditional Control



If else statement

Syntax:

```
if (condition) statement1 ;
else statement2;
```

Example:

```
if  (a%2==0) cout << “even number\n”;
else cout << “odd number\n”;
```

Using expressions in statements

- In assignment <variable> = <expression> ;

```
x = a + b
z = (x * x * 4) + (y *2) + k ;
```

- In a branching statement as conditions

```
if ( a < b)
        {  cout << “a is smaller than b”; }
else
        { cout << “a is not smaller than b”; };
```