**C++ Tutorial**

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Development Cycle (Makefile)

* 1. Compiling and linking
  2. Applications
  3. Dynamic Shared Objects

1. Program Structure
   1. basic structure (01\_structure.cc)
   2. namespaces
   3. using DSOs (02\_app.cc)
2. Types (03\_types.cc)
   1. int, float, double, short, long, char, bool
   2. enum, struct
   3. strings
   4. vectors
   5. pointer
   6. reference (&) and deference operator (\*)
3. Operators (04\_operators.cc)
   1. arithmetic: +, -, \*, /, %, -=, +=, /=, ++, --
   2. relational: ==, !=, >, <. >=, <=
   3. logical: !, &&, ||
   4. bitwise: &, |, ^, ~, <<, >>
   5. conditional (condition) ? a : b
4. Controls (05\_controls.cc)
   1. if
   2. while
   3. for
   4. do .. while
   5. switch (06\_argc\_argv.cc)
5. Basic I/O (07\_io.cc)
   1. cout, cin
   2. fstream, getline, stringstream, sprintf
6. Functions (08\_functions.cc)
   1. declaration vs. implementation
   2. global and local scope
   3. by reference, by value, by pointer
   4. default values
   5. overloaded functions
   6. inline
7. Dynamic Memory (09\_memory.cc)
   1. new type
   2. new type [#elements]
   3. delete pointer
8. **Object Oriented Programming** (10\_classes.cc)
   1. class, object, this pointer (11\_classes.cc)
   2. constructor, destructor (12\_classes.cc)
   3. methods (13\_classes.cc)
   4. overloaded methods (14\_classes.cc)
   5. static methods
   6. private, protected, public
   7. inheritance, initialization list
   8. polymorphism (virtual methods, virtual destructor)
   9. abstract base class (pure virtual method)  
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9. Templates (15\_templates1.cc)
   1. function templates (16\_templates2.cc)
   2. template classes
   3. template specialization
10. Standard Template Library (STL) (17\_stl.cc)
    1. vector
    2. list
    3. pair
    4. map
    5. algorithm (copy, random\_shuffle)
11. Exceptions (18\_exception.cc)