ITC313 - Makefile

Fundamentals of programming: Introduction to C++/C

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Tutorial

Makefile

Students are introduced to the compilation of multiple files using Makefile.

```
[code]$ ls
point.cpp   point.h     point_main.cpp
[code]$ g++ -c point.cpp
[code]$ ls
point.cpp   point.h     point.o     point_main.cpp
[code]$ g++ -c point_main.cpp
[code]$ ls
point.cpp   point.h     point.o     point_main.cpp point_main.o
[code]$ g++ -o point_main point.o point_main.o
[code]$ ls
point.cpppoint.h     point.o     point_main  point_main.cpp point_main.o
[code]$ ./point_main
New point (2.3,-5.7)
x_a = 2.3
y_a = -5.7
New point (0,0)
x_point = 0
y_point = 0
New point (0,0)
…
```

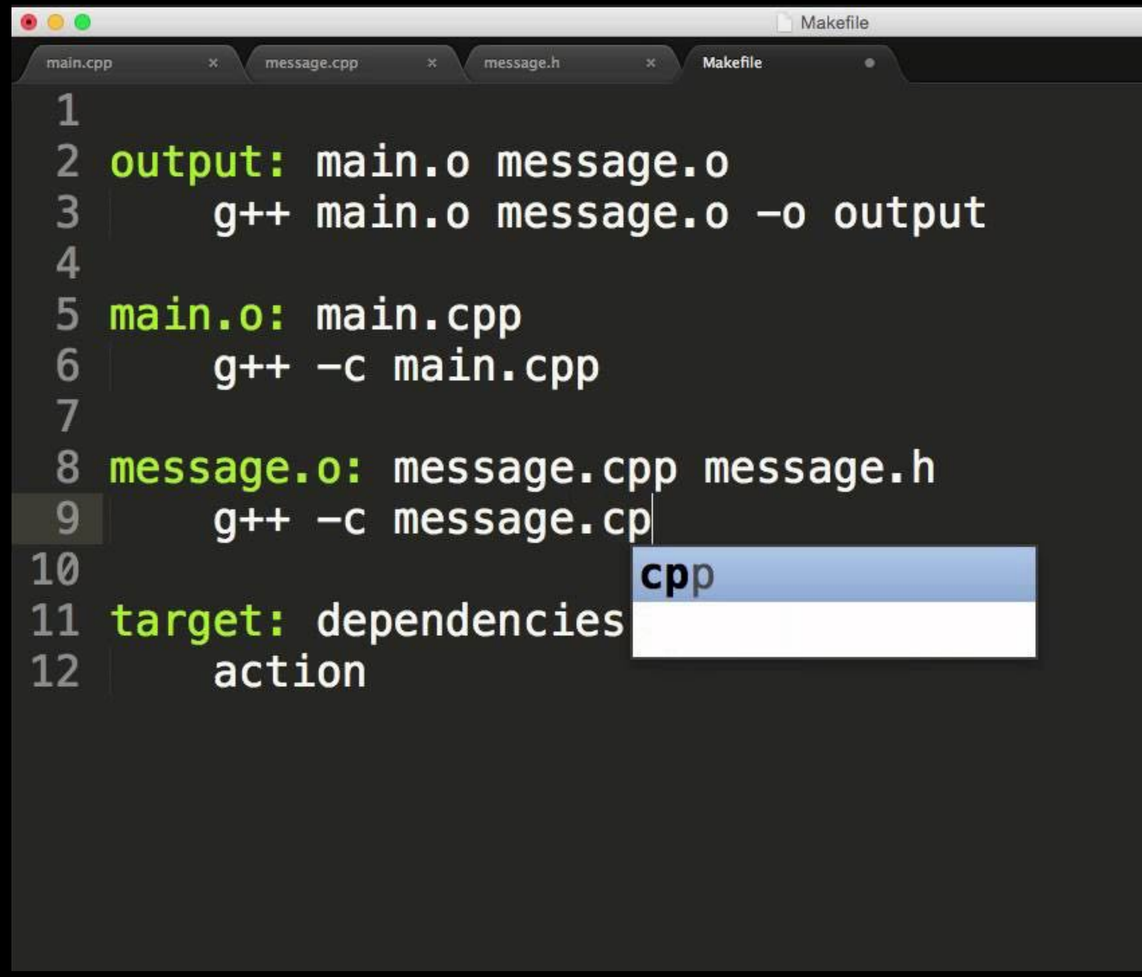
When editing a file, how to be sure to compile the adequate file ?

Compiling multiple files

Automate the compilation process with Makefiles

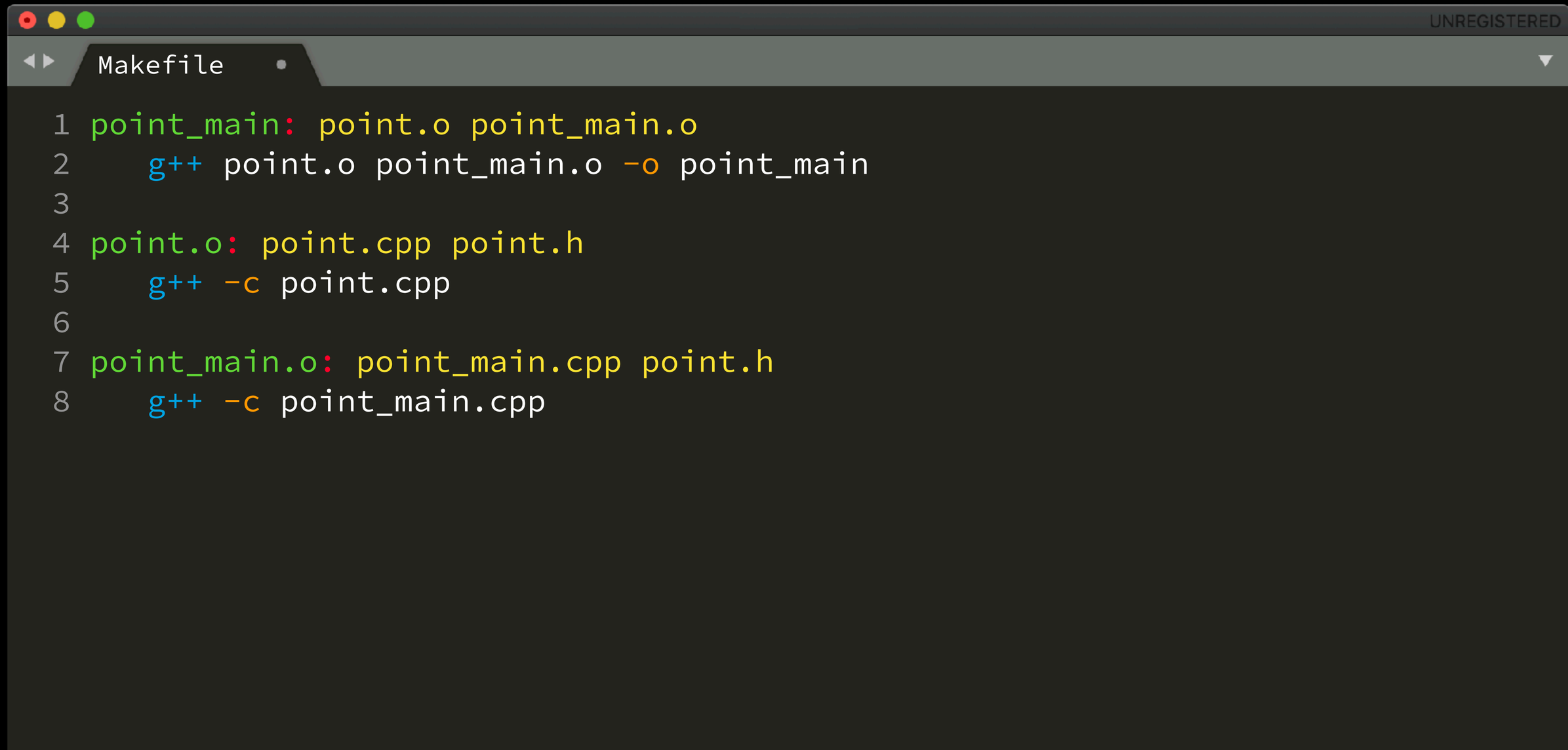
You just tell the Makefile "What you want to make" and "How it goes about making it".

You just type "make"



See https://www.youtube.com/watch?v=_r7i5X0rXJk

A basic Makefile



A basic Makefile

UNREGISTERED

Makefile

```
1  all: point_main
2
3  point_main: point.o point_main.o
4      g++ point.o point_main.o -o point_main
5
6  point.o: point.cpp point.h
7      g++ -c point.cpp
8
9  point_main.o: point_main.cpp point.h
10     g++ -c point_main.cpp
11
12 clean:
13     rm -f *.o
14
15 mrproper: clean
16     rm -f point_main
17
18 exe: point_main
19     ./point_main
```

A more generic Makefile

UNREGISTERED

Makefile

```
CXX         = g++
CXXFLAGS    = -Wall -Wextra
LDFLAGS     =
SRCS        = point.cpp point_main.cpp
OBJS        = $(SRCS:.cpp=.o)
TARGET      = point_main

all: $(TARGET)

$(TARGET): $(OBJS)
    $(CXX) $(CXXFLAGS) $(LDFLAGS) -o $(TARGET) $(OBJS)

point.o: point.cpp point.h
    $(CXX) $(CXXFLAGS) -c point.cpp

point_main.o: point_main.cpp point.h
    $(CXX) $(CXXFLAGS) -c point_main.cpp

clean:
    rm -f *.o

mrproper: clean
    rm -f $(TARGET)

exe: $(TARGET)
    ./$(TARGET)
```

A more generic Makefile

UNREGISTERED

Makefile

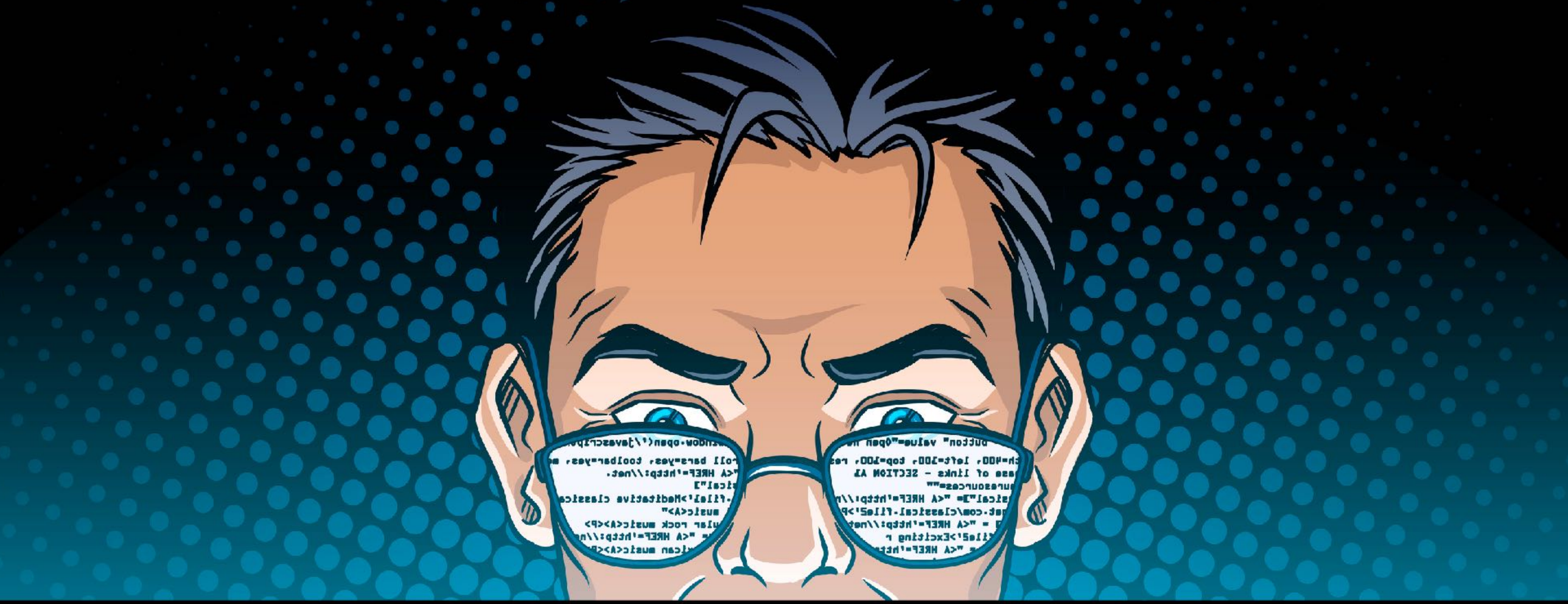
```
CXX         = g++
CXXFLAGS    = -Wall -Wextra
LDFLAGS     =
SRCS        = point.cpp point_main.cpp
OBJS        = $(SRCS:.cpp=.o)
TARGET      = point_main

all: $(TARGET)

$(TARGET): $(OBJS)
    $(CXX) $(CXXFLAGS) $(LDFLAGS) -o $(TARGET) $(OBJS)

point.o: point.cpp point.h
    $(CXX) $(CXXFLAGS) -c point.cpp

point_main.o: point_main.cpp point.h
    $(CXX) $(CXXFLAGS) -c point_main.cpp

clean:
    rm -f *.o

mrproper: clean
    rm -f $(TARGET)

exe: $(TARGET)
    ./$(TARGET)
```

A more generic Makefile

UNREGISTERED

Makefile

```
1  CXX         = g++
2  CXXFLAGS    = -Wall -Wextra
3  LDFLAGS     =
4  SRCS        = point.cpp point_main.cpp
5  OBJS        = $(SRCS:.cpp=.o)
6  TARGET      = point_main
7  DEPFLAGS    = -MMD -MP
8  DEPS        = $(OBJS:.o=.d)
9
10 all: $(TARGET)
11
12 $(TARGET): $(OBJS)
13     $(CXX) $(CXXFLAGS) $(LDFLAGS) -o $(TARGET) $(OBJS)
14
15 %.o: %.cpp
16     $(CXX) $(CXXFLAGS) $(DEPFLAGS) -c  $<
17
18 clean:
19     rm -f *.o *.d
20
21 mrproper: clean
22     rm -f $(TARGET))
23
24 exe: $(TARGET)
25     ./$(TARGET)
26
27 -include $(DEPS)
```



So let’s start coding!

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