

# CSSE3100 Study Notes

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## 1 Derivation

Programs can be derived from specifications statements.

This allows programs to be proved correct when the program is being developed rather than after development.

## 2 Assignment Rule

## 3 Skip Rule

## 4 Composition Rule

A specification statement can be separated into two statements by the composition rule.

## 5 JML Constructors

```
/*@ requires c >= 0;
   @ ensures getCredits == c;
   @*/
public Constructor(int c) {
    this.c = c;
}
```

Constructors can only reference parameters not instance variables as they have not yet been initialized.

## 6 JML Visibility

Specifications obey visibility of java access modifiers unless overridden by above syntax

```
/*@ spec_public */ private int status;
```

## 7 JML Invariants

Invariants are always true properties of a class which are:

- ensured by a constructor
- maintained by each method

```
/*@ invariant x;
   @ invariant y;
   @*/
```

Helper methods do not need to maintain the invariant

```
private /*@ helper @*/ helperMethod() {}
```

## 8 Weakest Precondition

$$Q \Rightarrow P$$

$$\begin{aligned} & w:[P, Q] \sqsubseteq w:[P, M]; w:[M, Q] \\ & w:[P, Q] \sqsubseteq w:[P, M]; w:[M, Q] \\ & w:[P, Q] \\ & \sqsubseteq (Composition : chooseMasM) \\ & w:[P, M]; w:[M, Q] \end{aligned}$$