

# CSSE3100 Study Notes

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Brae

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Programs can be derived from specifications statements.

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

## Composition Rule

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

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

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

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

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

Invariants are always true properties of a class which are:

- ensured by a constructor
- maintained by each method

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

Helper methods do not need to maintain the invariant

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



$$Q \Rightarrow P$$

$$w:[P, Q] \sqsubseteq w : [P, M]; w : [M, Q]$$

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$$w:[P, Q]$$

$$\sqsubseteq (\textit{Composition} : \textit{chooseMasM})$$

$$w:[P, M]; w:[M, Q]$$