Assignments 10.2

一、阅读（Reading）

1. 阅读教材.

2. 课外阅读：

Abstract Algebra-Morphisms（by James L. Hein）.pdf

二、问题解答（Problems）

1. 教材第七章习题：题 12、13、15、19.

2. Find the three morphisms(定义 3 个同态映射) that exist from the algebra $<N_3; +_3>$ to the algebra $<N_6; +_6>$.

3. Show that there is an epimorphism(满同态) between the set B of binary numerals(二进制数) with the usual binary addition(一般二进制加法) defined on B and the set N of natural numbers with the usual addition on N.

4. Suppose we define $f : Z \rightarrow Q$ by $f(n) = 2^n$.

+ is usual addition operation on Z and and ○ is usual multiplication on Q; - is negation operation(求负数运算) on Z and *inv* is inverse (求倒数). Show that

a. f is a monomorphism(单同态) from the algebra <Z; +> to the algebra <Q; ○>.

b. f is a monomorphism from <Z; +, - > to <Q; ○, *inv*>.

5.

a. Show that $<N_k; +_k>$is a semigroup(半群) .

b. Let ○ be the binary operation over {a, b, c} defined by the following table. Show that ○ is associative by finding an isomorphism(同构) of the two algebras $<\{a, b, c\}; \circ>$ and $<N_3; +_3>$.

○	a	b	c
a	c	a	b
b	a	b	c
c	b	c	a

三、项目实践（Programming）(Optional)

无