CSci 2041 - Advanced Programming Principles

Spring 2017

Homework 3

Name: Tiannan Zhou

Email: zhou0745@umn.edu ID:5232494

**Question 1:**

We would like to show that

The principle of induction for natural numbers is

In this case, our property P is defined as

is

Our induction proof would have two cases:

* : show that

by definition of

* : show that where holds by the inductive hypothesis.

by definition of

by property of addition and subtraction

by inductive hypothesis

by property of multiplication and power

**Question 2:**

We would like to show that

The principle of induction for this typeis

In this case, our property P is defined as

is

Our induction proof would have two cases:

* : show that

by definition of

by definition of power

by definition of

* : show that when holds by the inductive hypothesis.

by the definition of

by induction hypothesis

by the definition of multiplication and power

by the definition of

**Question 3:**

We would like to show that

The principle of induction for list is

In this case, our property is defined as

Our induction proof would have two cases:

by properties of lists

by properties of addition

by definition of

by definition of

by induction hypothesis

by definition of

**Question 4:**

We would like to show that

The principle of induction for list is

In this case, our property is defined as

Our induction proof would have two ceses:



by definition of



by the definition of

by the property ofproven in Question 3

by induction hypothesis

by definition of

by property of addition

by definition of

**Question 5:**

**Question 6:**

**Question 7:**