# Exam 2 – Topics and Ideas

## Randomness

What are all of the different pieces of code that we need in order to use random numbers in our program? How can we get random dice rolls or random numbers in a range? What does it mean to seed the random number generator, and what goes wrong if we don't?

## Vectors and Arrays

What is an array? What is a vector? Show examples of the correct syntax to use for each. What does it mean to blow array or index bounds? What happens with a vector? How about an array? How do I add a new element to a vector? How do I access a particular element of a vector? How do I change a particular element of a vector. How do I walk through all elements of a vector and perform some operation on it? What is an index?

Write code to print out every element of an array/vector. How would I add up all of the numbers in an vector? What if wanted to add up the squares of those numbers?

How do we pass vectors into functions as inputs? What is the syntax?

## Functions

What are functions? Why do we write them? Couldn't we just write all of our code without them? What would be the disadvantages of that? What do the words \locality" and \scope" mean?
How does data enter functions, and how does it leave? What does a return mean? What is void? What is call by value? What is call by reference? What is call by constant reference? What is the difference between them all? When is each used?

Recursion When is a function recursive? What is a recursive case? In what circumstances is recursion used? What is the difference between iteration and recursion? How can one identify a function as recursive? How can one identify a stopping case? What is the difference between a base case and a recursive case? How are stack overflow and recursion related? What is infinite recursion?