The second exam covers chapters 6 through 11. In this exam you will not be asked to prove anything formally, but you might have to justify an answer with a sketch of a proof. The specific topics that may appear on the exam are:

- Kleene's Theorem and its consequences, as well as the constructive algorithms used in its proof.
- Finite automata with output: Mealy and Moore machines, and their equivalence.
- Closure properties of sets and closure properties of regular languages. This can include questions such as whether regular languages are closed under particular operators.
- Pumping lemma for regular languages, including its application and consequences. This will include questions such as whether a particular language is regular or not.
- Myhill-Nerode theorem and its consequences
- Decidability of questions concerning regular languages: emptiness, finiteness, equivalence and related questions.

The types of questions on the exam will be the same as were on the first exam. Below are soem sample questions that will be of the same difficulty and type as you can expect to see.

1. T or F If L1 and L2 are regular languages, then L3 = {xy | x is in L1 and y is not in L2 } is also a regular language.
2. T or F The number of symbols output by a Mealy machine is always equal to the number of symbols it reads on its "tape".
3. T or F The language { ww^R | w in A* } where A = {a} is not regular.
4. Name the types of machines that have been described in the class so far that can have multiple final states.
5. Is the language { a^nb^n | n > 0 } a regular language? If it is, show a FA that accepts it. If it is not, show how you know it is not.
6. Is the language { a^n | n is a perfect square } a regular language? Why or why not?
7. Describe an algorithm that can be used to decide whether two regular expressions are equivalent.