**GP3112- Advanced Concepts in Programming I**

**Lab 2 - Regular Expressions and Finite State Machines**

1. Construct a simple finite state machine with the appropriate transitions including the following states:

GAME\_INIT, GAME\_MENU, GAME\_EXIT, GAME\_STARTING, GAME\_RESTART, and GAME\_RUNNING

1. Using the symbol and operators, provide definitions for the following operators:

|  |  |
| --- | --- |
| **Operator** | **Definition** |
| ? | Zero or one occurrence of the previous element |
| + | One or more occurrences of the previous element |
| {n} | Exactly n occurrences of the previous element |
| {n,} | At least n occurrences of the previous element |
| {n,m} | At least n occurrences but no more than m occurrences of the previous element |

1. Provide regular expressions for the following:

* A username consisting of letters or numbers, no spaces, and must be at least 8 characters long.
* A password containing at least 8 characters, must include at least one capital letter, and one number.

1. Draw Finite State Machines for the following regular expressions:

* ((ab)|c)\*
* 1\*(01\*01\*01\*)
* (a\*b\*)\*

1. Write a regular expression which ensures the following information is in the correct format:

* Date: 08/05/2016 (Should allow absence of forward slash)
* SSN: 123-45-6789 (Should allow absence of hyphen)
* Phone Number: (800) 123-4567 (Should allow the absence of a hyphen and/or space)

1. Write a program which reads from an input file and attempts to find the following:

* All phone numbers of the form xxx-xxx-xxxx
* All words beginning with a capital letter