

Professor: Joe Culberson

CMPUT 115(Pascal) Section A2
MIDTERM One Oct. 6, 2000
CLOSED BOOK. NO Notes or Calculators.
Time 50 minutes.
Answer all questions in space provided
Do scratch work on page backs



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CMPUT 115 (A2)
CULBERSON, J.
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PAGES: 5

Last Name: _____

First Name: _____

Make sure your name and ID is on the top of each internal page

Question 1 *Marks 3* Convert the following RPN expression to Infix notation.

X W - M N * + A /

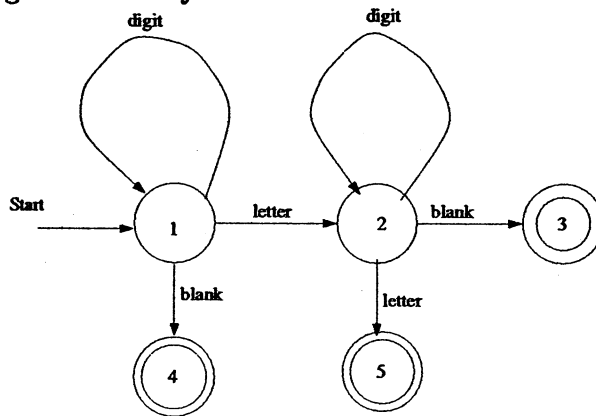
Question 2 *Marks 3* You have a queue **Q** and a stack **S**. Both are initialized, the stack is empty, and is capable of holding as much as the queue. Write a Pascal program fragment to remove the items from the queue and put them back in reverse order. You can assume there is a **USES** statement that links to the necessary queue and stack procedures, and that any variables you may need have already been declared of the appropriate type (you do not need to write any declarations). The operations available for your use are **Push**, **Pop** and **EmptyS** for the stack, and **AddQ**, **RemoveQ** and **EmptyQ** for the queue.

Question 3 Marks 4 Design (DRAW) a finite state automaton to recognize strings containing an even number of "1"s. Your machine should skip-over any other characters, except blank. Thus, "011ab\$011" and "xyz" each have an even number of 1's and would be accepted, while "11111" does not and should be rejected. Strings are *always* terminated by a blank. Indicate clearly the accept and reject states.

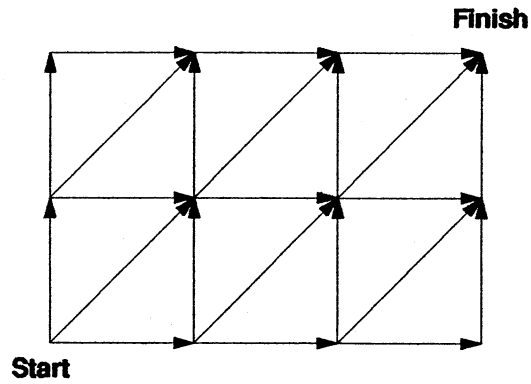
Question 4 Marks 4 Write a code fragment to scan a string X starting in position 1 to implement the following finite state machine. Your code should terminate when one of the 3 states with double circles is encountered, and output the final state. You do not need to copy the string or any portion of it. Some declarations of set constants are given that may be useful.

```

CONST    digit = ['0' .. '9'];
         letter = ['a' .. 'z'];
         blank = ' ';
    
```



Question 5 *Marks 6* Write a recursive Pascal function to compute the number of paths from start to finish for the accompanying diagram, where moves are one of right, up, or diagonal, as indicated by the arrows.



Question	Mark	Out Of
1	_____	3
2	_____	3
3	_____	4
4	_____	4
5	_____	6
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Total	_____	20