

16/20

- [1] (a) Write the following expression in Lisp.

$10 - 3 + 45 * 8$   
~~( $\lambda(x)(x^2 + 3x - 10)$ )~~  
~~( $\lambda(x)(x^2 + 3x - 10)$ )~~  
 $> (+ (- 10 3) (* 45 8))$

- (b) In Lisp, the div operator is not defined, but the operators mod is defined.

$$10 \bmod 3 = 1$$

write a function div that simulates the "div" operator. The function div will receive two integers n & m and returns the value n div m.

$> (\text{defun div}(n m)$   
~~(IF (= (mod n m) 0) 0~~  
~~(+ 1 (div n (- m 1))))~~

~~IS (n % m = 0)  
return 0  
else  
return (+ div(n, m-1))~~

- [2] The 3 key points that characterizes the imperative (procedural) paradigm are:

1. ~~instructions are executed sequentially~~
2. ~~variables are used to represent memory locations~~
3. ~~assignment statements are used to change the value of a variable.~~

While the key points that characterizes the Object Oriented (procedural) paradigm are:

1. ~~the creation of objects & classes is Encapsulation of Data & Function~~
2. ~~Inheritance~~
3. ~~Polyorphism~~

(19)

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Quiz 2

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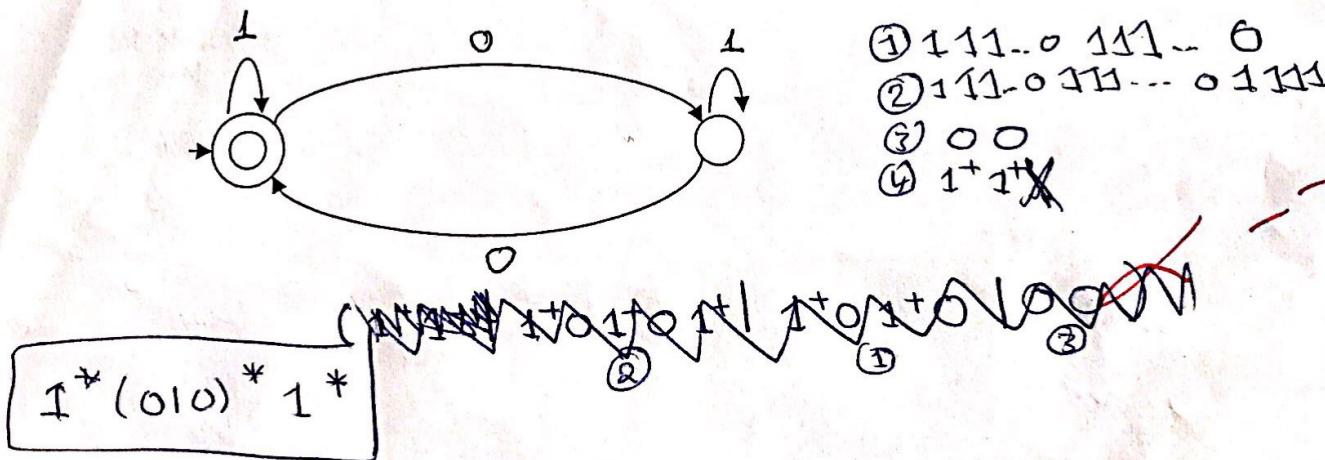
- [1] Given the Binary Alphabet {0,1}, Write a regular expression that:  
 (a) Begins with 00 and ends with 11.

$$00(011)^*11$$

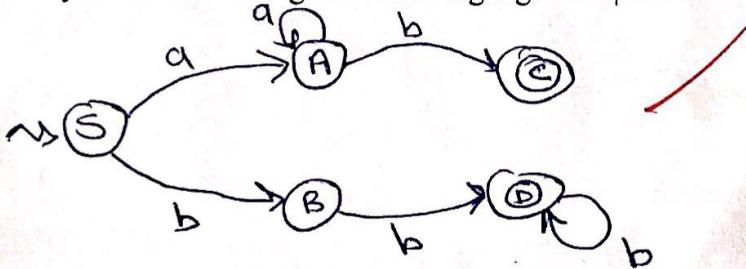
- (b) Contains at least three 1's

$$(011)^*111(011)^*$$

- [2] (a) write down the regular expression accepted by the following FSA



- (b) Draw directly a FSA that recognizes the language  $a^+b \mid b^2b^*$



[3] (a) Given the following piece of code in C:

```
float jump(float, float);  
int n;  
float x, y;  
const int m=10;  
float z=jump(x, y);  
n=m;
```

→ table for user-defined names.

Build the symbol table after the above code is executed.

Name	Type	Value
Jump	function-name "float"	
n	int	10
x	float	0
y	float	0
m	Const int	10
z	float	Jump(x, y)

(b) What are the tokens generated by the following code?

```
int N=100;  
N++;
```

int  
N  
=  
100  
i  
N  
++  
+  
N  
;