Q1.

a) Consider the EVEN-EVEN language, defined over Σ={a, b}.

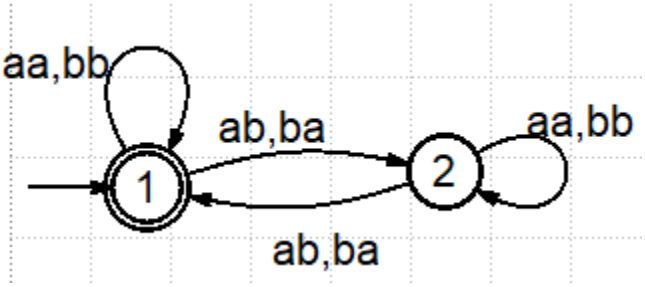
i. Write Regular Expressions of the above language
ii. Draw T.G. of the given language

Ans:

i. Write Regular Expressions of the above language

$$(aa+bb+(ab+ba)(aa+bb)^{*}(ab+ba))^{*}$$

ii. Draw T.G. of the given language



b) Describe the difference between

i. FA and TG

Ans:

	Finite Automata	**Transition Graph**
1	Finite number of states, having one initial and some (maybe none) final states.	Finite number of states, at least one of which is start state and some (maybe none) final states.
2	Finite set of input letters (Σ) from which input strings are formed.	Finite set of input letters (Σ) from which input strings are formed.
3	Finite set of transitions i.e. for each state and for each input letter there is a transition showing how to move from one state to another	Finite set of transitions that show how to go from one state to another based on reading specified substrings of input letters, possibly even the null string (Λ).

4	Every FA is a TG as well	TG may not be an FA
5	In Finite Automata transitions are marked with single letter of alphabet	In Transition Graph, they can be marked with letters or strings (combined of letters)
6	In a standard Finite Automaton (FA), you typically do not explicitly visualize or represent epsilon (λ) transitions in the state transitions. In other words, a state acting as the initial and final state can be considered as accepting epsilon.	In a Transition Graph (TG), you can explicitly represent epsilon (λ) transitions, which are transitions that occur without consuming any input symbol
7	In FA states transition are shown for all letters of given alphabet	In TG, it does not necessarily shows transitions for all letters and even represents multiple paths of each letters.
8	Strings transitions cannot be showed with FA	String transitions can be showed with TGs

ii. TG and GTG.

Ans:

	Transition Graph	**Generalized Transition Graph**
1	Finite number of states	Finite number of states
2	Finite set of input strings	Finite set of input strings
3	Finite set of transitions including NULL string	Finite set of transitions including NULL string and transitions can represent Regular expressions.

Q2. Consider the language L, defined over Σ={a, b}, in which **a's occur only in even clumps and that ends in three or more b's**.

i. Write Regular Expression of the above language
ii. Draw TG of the above language

Ans:

i. Write Regular Expression of the above language

$$(aa)^*b(b^*+(aa(aa)^*b)^*)\,bb$$

OR

$$(aa)^*b(b^*+(\,(aa)^+b)^*)\,bb$$

ii. Draw TG of the above language