

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the Name of Allāh, the Most Gracious, the Most Merciful

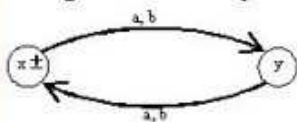
Paper Pattern

MCQS 40 each 1 mark
Short 4 each 2 marks
Short 4 each 3 marks
long 4 each 5 marks

Question No : 2 of 52

Marks: 1 (Budgeted Time 1 Min)

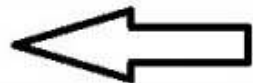
Below given FA can be represented by



Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ $((a+b)(a+b))^*$



☐ $(a+b)(a+b)^*$

☐ $(a+b)(a+b)$

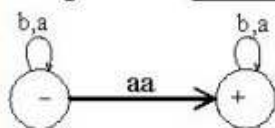
☐ $(a+b)^*(a+b)^*$

Made by: Waqar Siddhu

Question No : 3 of 52

Marks: 1 (Budgeted Time 1 Min)

Below given TG has _____ RE.



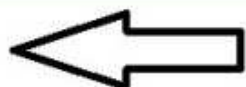
Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ $(b+a)(aa)(b+a)^*$

☐ $(a+b)(aa)(a+b)^*$

☐ $(a+b)^*(aa)(a+b)^*$



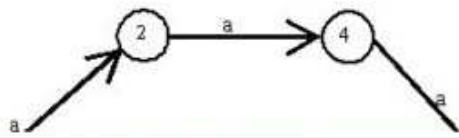
☐ $(a+b)^*(aa)(a+b)$

Made by: Waqar Siddhu

Question No : 4 of 52

Marks: 1 (Budgeted Time 1 Min)

Below given TG's are _____



Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☐ non-symmetric
- ☐ Equivalent
- ☐ Non-equivalent
- ☐ TG's are not valid

Made by: Waqar Siddhu

Question No : 5 of 52

Marks: 1 (Budgeted Time 1 Min)

One GTG can generate _____ language

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☐ more than one
- ☒ only one
- ☐ only two
- ☐ only three



Made by: Waqar Siddhu

Question No : 6 of 52

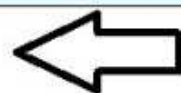
Marks: 1 (Budgeted Time 1 Min)

Even-palindrome is a _____ language

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☒ non-regular
- ☐ regular
- ☐ regular but infinite
- ☐ regular but finite



Made by: Waqar Siddhu

Question No : 7 of 52

Marks: 1 (Budgeted Time 1 Min)

If L_1 and L_2 are two regular languages, then _____ is/are also regular.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Both $L_1 \cup L_2, L_1 \cap L_2$



☐ $L_1^c \cap L_2$

☐ $L_1 \cup L_2$

☐ $L_1 \cap L_2$

Made by: Waqar Siddhu

Question No : 8 of 52

Marks: 1 (Budgeted Time 1 Min)

If the FA has N states, then test the words of length less than N . If any one word is accepted by this FA, then it will accept _____ word.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ All



☐ No

☐ One

☐ Two

Made by: Waqar Siddhu

Question No : 9 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are equivalent?

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ $1(001)^*$ and $(10)^*10$

☐ $x(\text{xx})^*$ and $(x)^*x$

☐ x^+ and x^*



☐ x^+ and x^*x^+

Made by: Waqar Siddhu

Question No : 10 of 52

Marks: 1 (Budgeted Time 1 Min)

An alphabet of Σ is valid if

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☐ No letter of Σ appears in middle of any other letter
- ☐ No letter of Σ appears at end of any other letter
- ☐ No letter of Σ appears at start of any other letter
- ☐ No letter of Σ appears at end or middle of any other letter



Made by: Waqar Siddhu

Question No : 11 of 52

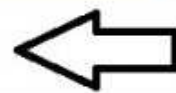
Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are not equivalent?

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☐ $(ab)^*$ and a^*b^*
- ☐ $x(xx)^*$ and $(xx)^*x$
- ☐ x^+ and x^*x^+
- ☐ $x(x)^*$ and $(x)^*x$



Made by: Waqar Siddhu

Question No : 12 of 52

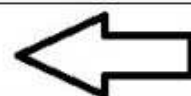
Marks: 1 (Budgeted Time 1 Min)

There exist _____ derivations of a certain word in ambiguous grammar.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☐ more than one
- ☐ Exactly one
- ☐ exactly two
- ☐ no



Made by: Waqar Siddhu

Question No : 13 of 52

Marks: 1 (Budgeted Time 1 Min)

Regular languages are closed under _____

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Union and Concatenation



☐ Union and Division

☐ Union and Exponent

☐ Union and Factorial

Made by: Waqar Siddhu

Question No : 14 of 52

Marks: 1 (Budgeted Time 1 Min)

Which one of the following statements is INCORRECT:

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ A language consisting of all strings over $\Sigma=\{a,b\}$ having equal number of a's and b's is a regular language

☐ Every language that can be expressed by FA can also be expressed by RE

☐ None of these



☐ $(a+b)^*aa(a+b)^*$ generates Regular language.

Made by: Waqar Siddhu

Question No : 15 of 52

Marks: 1 (Budgeted Time 1 Min)

TM is more powerful than FSM because

not sure

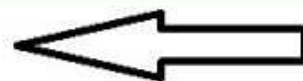
Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ The tape movement is confined to one direction

☐ It has no finite state control

☐ It has the capability to remember arbitrary long sequences of input symbols



☐ The tape movement is confined to more than one directions

Made by: Waqar Siddhu

Question No : 16 of 52

Marks: 1 (Budgeted Time 1 Min)

CYK algorithm was invented by John Cocke and later was published by ____

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Talik Khon and Daniel H

☒ Tandao Kasami and Daniel H

☐ Tandao Dagger and Daniel H

☐ Talik Khon

Made by: Waqar Siddhu

Question No : 17 of 52

Marks: 1 (Budgeted Time 1 Min)

The process of finding the derivation of word generated by particular grammar is called ____

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Processing

☒ Parsing

☐ Programming

☐ Planing

Made by: Waqar Siddhu

Question No : 18 of 52

Marks: 1 (Budgeted Time 1 Min)

There are different parsing techniques, including ____

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Top down parsing

☐ Bottom up parsing

☐ Parsing technique for particular grammar of arithmetic expression

☒ All of these

Made by: Waqar Siddhu

Question No : 19 of 52

Marks: 1 (Budgeted Time 1 Min)

$\Sigma = \{a, Aa, Abb\}$, then string $aAaAbbAa$ has length equal to _____.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Three

☒ Four

☐ One

☐ Two

Made by: Waqar Siddhu

Question No : 20 of 52

Marks: 1 (Budgeted Time 1 Min)

The language generated by CFG is called _____.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Infinite

☒ Context Free Language (CFL)

☐ Regular

☐ Finite

Made by: Waqar Siddhu

Question No : 21 of 52

Marks: 1 (Budgeted Time 1 Min)

In _____ there must be transition for all letters.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ NFA

☒ FA

☐ TG

☐ GTG

Made by: Waqar Siddhu

Question No : 22 of 52

Marks: 1 (Budgeted Time 1 Min)



Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ $r_1^* r_2 r_3^*$
☐ $(r_1 r_2 r_3)^*$
☐ $r_1^* r_2^* r_3^*$
☐ None of the given


Made by: Waqar Siddhu

Question No : 23 of 52

Marks: 1 (Budgeted Time 1 Min)

A regular language _____.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Must be finite

☐ Must be infinite

☐ Can be finite or infinite

☐ Complex Language


Made by: Waqar Siddhu

Question No : 24 of 52

Marks: 1 (Budgeted Time 1 Min)

If a language can be expressed by a regular expression, then its complement is _____.

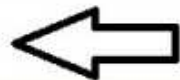
Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Regular

☐ Non Regular

☐ Finite

☐ Infinite


Made by: Waqar Siddhu

Question No : 25 of 52

Marks: 1 (Budgeted Time 1 Min)

For every Context Free Grammar (CFG), we can make the corresponding _____.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☐ FA
- ☐ TG
- ☐ PDA
- ☐ Regular Grammar

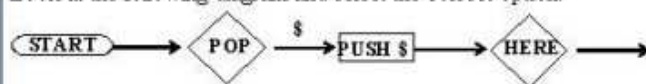


Made by: Waqar Siddhu

Question No : 26 of 52

Marks: 1 (Budgeted Time 1 Min)

Look at the following diagram and select the correct option:

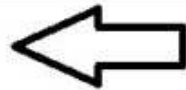


pg 120

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☐ The PDA must not begin with the sequence
- ☐ The PDA may begin with the sequence
- ☐ The PDA must begin with the sequence
- ☐ The PDA may not begin with the sequence



Made by: Waqar Siddhu

Question No : 27 of 52

Marks: 1 (Budgeted Time 1 Min)

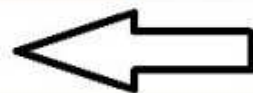
Consider the following Context Free Grammar (CFG) and select the correct choice

$S \rightarrow AB$
 $A \rightarrow BSB \mid a \mid b$
 $B \rightarrow CC$
 $C \rightarrow SS \mid b \mid bb$

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

- ☐ abb is a word in the corresponding CFL.
- ☐ abb is not the word of corresponding CFL.
- ☐ Any word can be accepted from the corresponding CFL.
- ☐ b is a word in the corresponding CFL.



Made by: Waqar Siddhu

Question No : 28 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following statement(s) is/are true or false?

- 1) The turing machine is similar to a finite automaton but with an unlimited and unrestricted memory.
- 2) A Turing machine is a much more accurate model of a general purpose computer.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Statement 1 is true

☐ Statement 2 is true

☐ Both statements (1 & 2) are false

☐ Statement 2 is false

Made by: Waqar Siddhu

Question No : 29 of 52

Marks: 1 (Budgeted Time 1 Min)

Language of strings having even number of a's is considered to be:

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Regular

☐ Irregular

☐ Irregular and infinite

☐ Irregular and finite

Made by: Waqar Siddhu

Question No : 30 of 52

Marks: 1 (Budgeted Time 1 Min)

If we have two transition graphs then their union will be expressed by:

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ taking a common start state and joining them by two null transitions

☐ just connecting both start states by null transitions

☐ connecting final state of first TG to the initial state of second TG

☐ connecting the final state of first TG to the final state of second TG

Made by: Waqar Siddhu

Question No : 31 of 52

Marks: 1 (Budgeted Time 1 Min)

A language of strings of prime length is considered to be:

Answer (Please select your correct option)

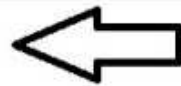
WWW.VirtualAcademyLive.com

☐ regular but infinite

☐ regular

☒ irregular

☐ regular but finite



Made by: Waqar Siddhu

Question No : 32 of 52

Marks: 1 (Budgeted Time 1 Min)

_____ and _____ are removed in order to make a CFG in Chomsky Normal Form (CNF).

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Null, nullable productions

☐ Nullable, unit productions

☒ Null, unit productions

☐ Strings of length 0, null



Made by: Waqar Siddhu

Question No : 33 of 52

Marks: 1 (Budgeted Time 1 Min)

The languages are supposed to be _____ in case of testing pumping lemma.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ context free

☐ irregular

☐ both regular and irregular

☒ regular



Made by: Waqar Siddhu

Question No : 34 of 52

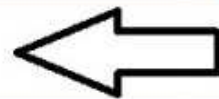
Marks: 1 (Budgeted Time 1 Min)

Which of the following refers to an effectively solvable problem having answer in "Yes" or "No"?

pg 80

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Decision procedure☐ Logical problem☐ Analytical problem☐ Binary procedure

Made by: Waqar Siddhu

Question No : 35 of 52

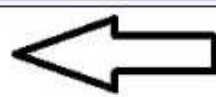
Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG).

 $S \rightarrow SX|XY$ $X \rightarrow ZZ$ $Y \rightarrow 0$ $Z \rightarrow 1$

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ 110☐ 11011☐ 1101111☐ 11101

Made by: Waqar Siddhu

Question No : 36 of 52

Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG).

 $S \rightarrow SX|XY$ $X \rightarrow ZZ$ $Y \rightarrow 1$ $Z \rightarrow 0$

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ 001☐ 00010☐ 0010000☐ 00100

Made by: Waqar Siddhu

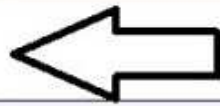
Question No : 37 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is a regular Context Free Grammar:

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ $S \rightarrow abS \mid baS \mid \wedge$ ☐ $S \rightarrow aSb \mid baS \mid \wedge$ ☐ $S \rightarrow abS \mid bSa \mid \wedge$ ☐ $S \rightarrow aSb \mid Sa \mid \wedge$

Made by: Waqar Siddhu

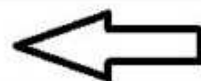
Question No : 38 of 52

Marks: 1 (Budgeted Time 1 Min)

Concatenation of r_1 and r_2 will be shown as:

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ $r_1 + r_2$ ☐ $r_2 + r_1$ ☐ $r_2 r_1$ ☐ $r_1 r_2$ 

Made by: Waqar Siddhu

Question No : 39 of 52

Marks: 1 (Budgeted Time 1 Min)

A nonterminal is said to be self-embedded, if in a given derivation of a word, it ever occurs as a tree _____ of itself.

pg 126 bk

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ ascendant☐ descendant☐ top☐ bottom

Made by: Waqar Siddhu

Question No : 40 of 52

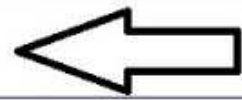
Marks: 1 (Budgeted Time 1 Min)

_____ is always Deterministic.

Answer (Please select your correct option)

WWW.VirtualAcademyLive.com

☐ Finite Automaton



☐ Transition Graph

☐ Generalize Transition Graph

☐ Non-deterministic finite automaton

Made by: Waqar Siddhu

Question No : 41 of 52

Marks: 2 (Budgeted Time 4 Min)

Write alternative form of this production:
 $S \rightarrow aS, S \rightarrow bS, S \rightarrow \Lambda$

Answer (Please click here to Add Answer)

WWW.VirtualAcademyLive.com

Rich text editor toolbar with icons for Bold, Italic, Underline, Text Color, Background Color, Bulleted List, Numbered List, Indent, Outdent, Link, Unlink, and a 100% zoom level.

Made by: Waqar Siddhu

Question No : 42 of 52

Marks: 2 (Budgeted Time 4 Min)

What are the uses of Push Down Automata (PDA) in computing?

Answer (Please click here to Add Answer)

WWW.VirtualAcademyLive.com

Rich text editor toolbar with icons for Bold, Italic, Underline, Text Color, Background Color, Bulleted List, Numbered List, Indent, Outdent, Link, Unlink, and a 100% zoom level.

The PDA is used in theories about what can be computed by machines. PDA described with a formal grammar, it can be used in parser design. The deterministic pushdown automaton can handle all deterministic context-free languages while the nondeterministic version can handle all context-free languages.

Made by: Waqar Siddhu

Question No : 43 of 52

Marks: 2 (Budgeted Time 4 Min)

What is meant by Row language?

Answer (Please [click here](#) to Add Answer)

WWW.VirtualAcademyLive.com

row language whose alphabet is $\Sigma = \{Row_1, Row_2, \dots, Row_7\}$ i.e. the alphabet consists of the letters which are the names of the rows in the summary table.

that the Row language is the language whose alphabet $\Sigma = \{Row_1, Row_2, \dots, Row_7\}$,

Made by: Waqar Siddhu

Question No : 44 of 52

Marks: 2 (Budgeted Time 4 Min)

Write down regular expression for a language L of strings defined over $\Sigma = (a, b)$ that neither ends in "a" nor with "b".

Answer (Please [click here](#) to Add Answer)

WWW.VirtualAcademyLive.com

Made by: Waqar Siddhu

Question No : 45 of 52

Marks: 3 (Budgeted Time 6 Min)

What are the steps of Recursive Definition of Languages?

Answer (Please

WWW.VirtualAcademyLive.com

Recursive definition of languages

The following three steps are used in recursive definition

Some basic words are specified in the language.

Rules for constructing more words are defined in the language.

No strings except those constructed in above, are allowed to be in the language.

Examples

Defining language of INTEGER

Step 1: 1 is in INTEGER.

Step 2: If x is in INTEGER then x+1 and x-1 are also in INTEGER.

Step 3: No strings except those constructed in above, are allowed to be in INTEGER.

Made by: Waqar Siddhu

Question No : 46 of 52

Marks: 3 (Budgeted Time 6 Min)

What does the following arbitrary summary table show?

FROM Where	TO Where	READ What	POP What	PUSH What	ROW Number
READ ₉	READ ₃	b	b	abb	11

Answer (Please click here to Add Answer)

Consider the following row from an arbitrary summary table

FROM Where	TO Where	READ What	POP What	PUSH What	ROW Number
READ ₉	READ ₃	b	b	abb	11

which shows that Row₁₁ is not Net style sentence because the trip from READ₉ to READ₃ does not pop one letter from the STACK, while it adds two letters to the STACK. However Row₁₁ can be concatenated with some other Net style sentences e.g. Row₁₁Net(READ₃, READ₇, a)Net(READ₇, READ₁, b)Net(READ₁, READ₈, b)

Which gives the nonterminal

Net(READ₉, READ₈, b), now the whole process can be written asNet(READ₉, READ₈, b) → Row₁₁Net(READ₃, READ₇, a) Net(READ₇, READ₁, b)Net(READ₁, READ₈, b)

Which will be a production in the CFG of the corresponding row language.

WWW.VirtualAcademyLive.com

Waqar Siddhu

Made by: Waqar Siddhu

Question No : 47 of 52

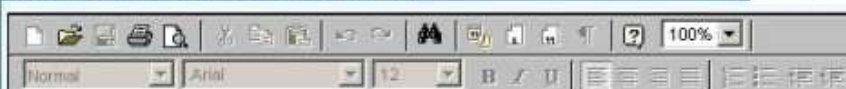
Marks: 3 (Budgeted Time 6 Min)

Write down Context Free Grammar (CFG) for the language of strings expressed by the following regular expression:

 $(a+b)^*(a+b)^*$

Answer (Please click here to Add Answer)

WWW.VirtualAcademyLive.com



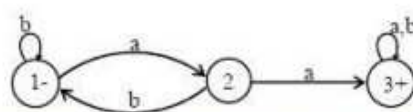
S->a|b|Xa|Xb, X->aX|bX|^

Made by: Waqar Siddhu

Question No : 48 of 52

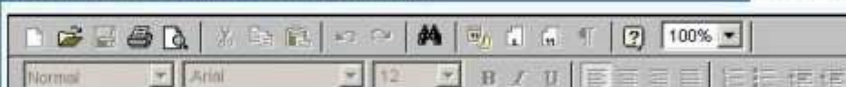
Marks: 3 (Budgeted Time 6 Min)

Let us consider the following Finite Automaton (FA):



Answer (Please click here to Add Answer)

WWW.VirtualAcademyLive.com



Made by: Waqar Siddhu

Write the CFG for EVEN-EVEN language?

Answer ([Please click here to Add Answer](#))

Example

$\Sigma = \{a,b\}$
productions:

$S \rightarrow SS$

$S \rightarrow XS$

$S \rightarrow \Lambda$

$S \rightarrow YSY$

$X \rightarrow aa$

$X \rightarrow bb$

$Y \rightarrow ab$

$Y \rightarrow ba$

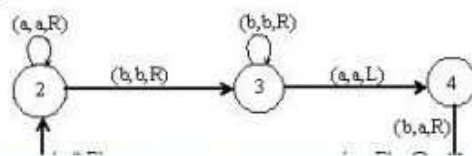
This grammar generates EVEN-EVEN language.

WWW.VirtualAcademyLive.com

Made by: Waqar Siddhu

Made by: Waqar Siddhu

Consider the following TM



Answer ([Please click here to Add Answer](#))

WWW.VirtualAcademyLive.com

Made by: Waqar Siddhu

Using suitable examples, differentiate between Kleene star closure and plus operation?

Answer (Please

Kleene Star Closure

Given Σ , then the Kleene Star Closure of the alphabet over Σ , including Λ .

It is to be noted that Kleene Star Closure can be defined over any set of strings.

Examples

If $\Sigma = \{x\}$

Then $\Sigma^* = \{\Lambda, x, xx, xxx, xxxx, \dots\}$

If $\Sigma = \{0,1\}$

Then $\Sigma^* = \{\Lambda, 0, 1, 00, 01, 10, 11, \dots\}$

If $\Sigma = \{aaB, c\}$

Then $\Sigma^* = \{\Lambda, aaB, c, aaBaaB, aaBc, caaB, cc, \dots\}$

Note

Languages generated by Kleene Star Closure of set of strings, are infinite languages. (By infinite language, it is supposed that the language contains infinite many words, each of finite length).

PLUS Operation (+)

Plus Operation is same as Kleene Star Closure except that it does not generate Λ (null string), automatically.

Example

If $\Sigma = \{0,1\}$

Then $\Sigma^+ = \{0, 1, 00, 01, 10, 11, \dots\}$

If $\Sigma = \{aab, c\}$

Then $\Sigma^+ = \{aab, c, aabaab, aabc, caab, cc, \dots\}$

WWW.VirtualAcademyLive.com**Mr Siddhu****Made by: Waqar Siddhu**

a. Construct Context Free Grammar (CFG) for the language defined by the regular expression:

$(ab + ba)^*(a + b)^*$

b. Remove null productions from the CFG constructed in part i.

Answer (Please [click here](#) to Add Answer)**WWW.VirtualAcademyLive.com****Made by: Waqar Siddhu**