

Source program

SECTION A is COMPULSORY (Carries 31 Marks)

QUESTION 1: (COMPULSORY) 16 MARKS

i. Using a diagram, explain **FOUR** components of Language Processing System. (8 Marks)

Describe a graphical depiction of the left-most derivation of a parse tree in syntax analyzer. (5 Marks)

iii. Summarizes what you understand by optimization in compiler design. (3 Marks)

QUESTION 2: (COMPULSORY) 15 MARKS

i. Describe components of the context-free grammar as used in the construction of Syntax analysis. (5 Marks)

iii. A compiler can broadly be divided into two phases based on the way they compile. Explain these two broad phases. (5 Marks)

iii. Write briefly on code generation as implied in Compiler design. (5 Marks)

SECTION B (Carries 39 Marks)

QUESTION 3(13 MARKS)

i. Describe how a program, using C compiler, is executed on a host machine. (6 Marks)

ii. Using a diagram enlighten on how lexical analysis works in the compiler design. (7 Marks)

QUESTION 4(13 MARKS)

i. Using a diagram, clarify what you understand by compilation process in the compiler design. (7 Marks)

ii. Elaborate in details **THREE** specifications of tokens as used in lexical analysis. (6 Marks)

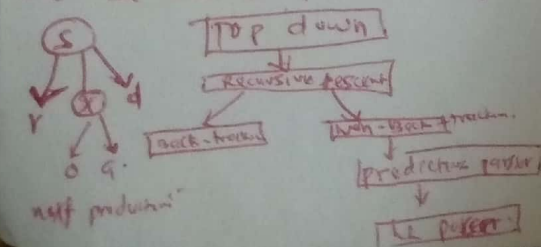
QUESTION 5(13 MARKS)

i. Deliberate **THREE** Limitations of Syntax Analyzers. (6 Marks)

ii. Argue **TWO** types of parsing as used in Syntax Analyzers. (7 Marks)

(i) TOP-down

Construction starts at the root node & proceeds to the leaf nodes.
- procedure is associated with non-terminal of a grammar.
- decides which procedure to use by examining the lookahead symbol.
- can be more easily constructed by hand.



Bottom-up

construction starts at the leaf nodes & proceeds to the root. Can be best in a larger class of grammars.
- works in upward direction, till it reaches root node.
- Here, we start from a sentence & then apply production rules in reverse manner in order to reach the start symbol.

i. Explain what you understand by regular language as used in regular expression of compiler design. (6 Marks)

ii. Discuss THREE algebraic laws that are obeyed by regular expressions, which can be used to manipulate regular expressions into equivalent forms. (7 Marks)

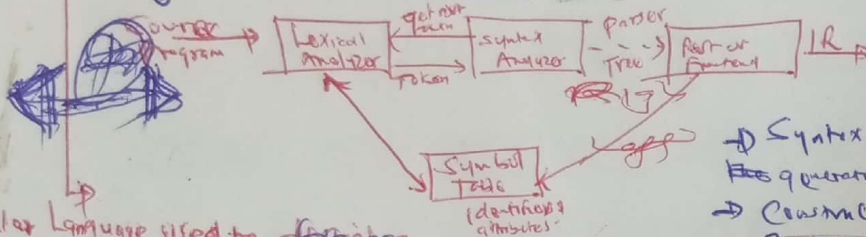
- ① Operations
- ② Notations (r) & (s)
- ③ Precedence & associativity

QUESTION 7 (13 MARKS)

i. To decide which non-terminal to be replaced with production rule in

Deviation, we can have two options. Show these options. $A \rightarrow \dots$ (7 Marks)

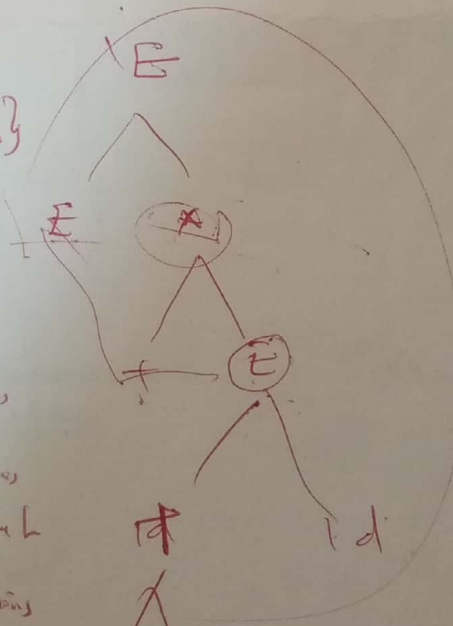
ii. Describe how a syntax analyzer or parser functions using a diagram. (6 Marks)



- Regular Language used to ~~define~~ formal programming language tokens process.
- The lexical analyzer needs to scan & identify only a finite set of valid strings/tokens/lexeme that belong to the language in hand.
- It searches for the pattern defined by the language rules.
- Regular expressions have the capability to express finite strings of symbol.
- Grammar defined by regular expressions is known as regular grammar.
- The language defined by regular grammar (regular language)

- Syntax Analyzer - Verifies the structure of the generated by tokens based on the grammar.
- Constructs the parse tree.
- Reports errors.
- Performs error recovery.

$E = E * E$ (KLD)
 Quiz 7
 (11) A-W



(1) Algebraic laws:

① Operations:

- (i) Union of 2 language L and M written as:
 $L \cup M = \{s \mid s \text{ is in } L \text{ or } s \text{ is in } M\}$
- (ii) Concatenation of 2 language L and M written as:
 $LM = \{st \mid s \text{ is in } L \text{ and } t \text{ is in } M\}$
- (iii) Kleene Closure of a language L written as:
 $L^* = \text{Zero or more occurrences of language } L$

② Notation - If r and s are regular expressions denoting the languages $L(r)$ & $L(s)$ then

- Union: $(r) \mid (s)$ is a regular expr denoting $L(r) \cup L(s)$
- Concatenation: $(r)(s)$ is a reg. exp denoting $L(r)L(s)$.
- Closure: $(r)^*$ is a regular expr denoting $L(r)^*$.
- (r) is a regular expression denoting $L(r)$.

(ii) Precedence & Associativity:

- $*$, Concatenation $()$, and $|$ (pipe sign) are left associative.
- $*$ - has the highest precedence.
- Concatenation $()$ - has the second highest precedence.
- $|$ (pipe sign) has the lowest precedence to all.

Question PPr UCC 301

Part ONE

4. Define the research problem research attempt to address (4mks).

Low demand for ~~more expensive~~ locally processed food for THe for food processors Association in Kenya

In researcher study, demand for locally processed food prices, increase of consumer government tax on inputs has lead to heavy pricing than locally processed food more expensive ~~As~~ compared to imported food. There is a great relationship b/w food processors as well as government agencies.

b) Develop 4 objectives for this study (marks)

To find out main cause of ^{that} low ~~and~~ demand for locally processed food.

- To identify how food processes related to government agencies.

- To establish why there is need to study heavy impurities of low toxic feed stuff

- Identifying best way to stabilize both importation & local food prices.

c). Identify a sampling methods used in study (2).

- Cluster Sampling:

- ~~Stratified~~ Random Sampling

Symmetrical 7 samples
stratified 8

d) Formulate 2 hypothesis for the study.

There is greater clarity b/w food processors & government agencies related to dairy trade & industry.

- Locally processed for demand is lower due to imported food stuffs cost - low as to income for consumers flow.

2) Identify 2 aspects of ^(Study coverage) scope for the above study.

- ① Locally processed food in country.
- ② Food prices
- ③ Income of consumers
- ④ Government tax on input & price.

f) Explain the significance of carrying out the study.

① problem solving - solving problem in food processor
research project
As well as for consumers of local food stuffs.

② Training in research - provide theoretical background of research project.

③ Science for forth — pure search, ~~create~~ knowledge

(9) Identify target popn of the study.

Consumers of locally processed food stuff in Kenya.

b) Explain importance of research proposal (6 marks)

Makes it known intentions of getting involved in research

1) Process of writing proposal allow researcher to plan & manage steps would undertake a project.

ii) provides justification for trading.

ii) After proposal approved, doc serves as a guide if relevant thru justification.

v) well designed proposal helps ~~researcher~~ avoid things

v) ^{time wasted} ~~proposed~~ ^{after} ~~provides~~ ^{no} ~~researcher~~ ^{have} ~~opport~~ ^{off-} ~~of~~ ^{researcher} ~~other~~ ^{to} ~~who~~ ^{discuss} ~~worked~~ ^{the} ~~on~~ ^{work}

Question 2.

- ① Explain meaning of hypothesis.
- Suggested soln to problem that arises largely a guess until facts are found to confirm it.

Que

- (b) Explain Qualities of a good research hypothesis (5 mks)
- Testable.

- Both the independent & dependent variables included.

- Simple & precise.

- State clearly & briefly giving expected rlsks b/w variables.

- Consistent with the purpose, statement & objectives of the study.

- Testable in a reasonable period.

- Based on a sound rationale derived from theory or previous research or professional experience.

- Consistent with accepted facts.

- c) distinguish b/w pure research & applied research (5 mks)

Pure research

study aimed at expanding the existing base of Scientific Knowledge - whole

Applied research - is the research that is

designed to solve specific practical problems

Pure research

- Aimed at expanding existing base of scientific knowledge

Applied Research

- Designed to solve specific practical problem or answer certain question

i) Theoretical

i) Practical

ii) Universal

ii) Limited

iii) Deepening scientific knowledge & prediction

iii) Development of technology & technique

iv) Goal - Add some knowledge to existing one

iv) Goal - To find out soln to the problem at hand.

Question 3.

Explain 3 sources of research problems.

i) Personal experience - Everybody has in one way or another been exposed to some interesting or challenging situation in school/outside school.

ii) Literature review - By reading previous studies done by other researchers and scientists believe experiments can be repeated at different times & in diff situations & yield similar results.

iii) Media - Issues which are frequently reported in media can also form basis of research.

iv) Attend professional conferences - to find new research products at national/regional conference.

v) Deductive Reasoning - conclusion that is made from particular to general.

vi) Practical issues - Society is faced many burning issues which not easily explainable.

⑤ Explain advantages & disadvantages of using the questionnaire technique to collect data (5 mks).

Advantages:

i) Economical - in time, effort & cost. No need to visit @ & interview respondent.

ii) Simultaneous special type of Response.

iii) Anonymity - respondents can't be identified for response given.

iv) Uniformity - Standardized records of response.

Disadvantages:

i) Limited response - ~~not~~

ii) Lack of personal contact

iii) poor response

iv) Incomplete entries.

3. (C).

Explain 3 factors to consider when formulating research problem (5mks).

1) Researchable or verifiable - one which can be investigated through the collection & analysis of data.

ii) Must have a theoretical/practical significance.

iii) Should be clear (clearly & concisely).

iv) It relates to academic discipline.

v) It has a basis in the research literature.

Quiz (4)

Explain meaning following terms

a) Conceptual Framework (5mks).

Comprise of your logical thoughts on identification of the research ~~topic~~ ^{topic}, the problem to be investigated,

the questions to be asked, literature to be reviewed,

Theories to be applied, the methodology you will use,

the methods, procedures, instruments, the data analysis & interpretation of findings, recommendations & conclusions you will make.

Thus, Conceptual Framework is the logical conceptualization of your entire project.

b) Theoretical Framework (5mks).

Comprise theories extracted by experts in the

field into which you plan to research. Is a structure

that summarizes concepts & theories which help you draw from previously tested & published

knowledge which you synthesize to help you have

a theoretical background base for research data.

Helps you to develop an informed, & realized low

process which you examine your data, conduct data analysis, interpret findings, discuss them, make recommendations & conclusion.

Quiz (C)

(5mks)

No. There is a need for the review of both theoretical & empirical literature.

This is of necessary indispensable part of the proposal. Literature review section is used as the basis of methodology invention.

- Lit review bring clarity & focus of your research problem.

- It improve your research methodology.

- Broaden your knowledge base in your research area.

- Contextualize your findings.

Quiz (5)

a) Explain 5 qualities of an effective title of a research paper (5mks).

i) Contain key variables in the research study.

ii) Attract the attention & interest of the reader.

iii) Relate to the topic, niche area & discipline.

iv) Short, descriptive & to the point.

v) Make clear sense.

b) Describe 3 components of a research proposal highlighting the importance of each part (5mks).

Section one: Preliminary information

Title page - should have

1) Table of contents

2) Acknowledgement

3) Declaration page

4) List of figures

5) Acknowledgement

Section 2: Body

i) Introduction - problem statement, purpose of study, objectives, hypothesis, justification of study, assumptions, conceptual framework.

ii) Literature review.

iii) Research design & methodology.

Section 3: References

Name of authors or books reviewed

Appendices - time plan & budget.

Robert W.A (2017) Research methods, Ken

Format of Research Proposal

Section 1: Preliminary Information

First one: Title page

Should have:

- ① A clear title
- ② Name of Student: Reg no, Dept, Faculty
- ③ Required Fulfilment
- ④ Date e.g. May 2021

Other preliminary information:

- ① Table of contents
- ② Authority from supervisor
- ③ Dedication page
- ④ List of figures
- ⑤ Acknowledgement / dedication.

Section 2: Body

Chapter 1: Introduction

- ① Problem statement
- ② Objectives
- ③ Justification of study
- ④ Purpose of study
- ⑤ Hypothesis
- ⑥ Conceptual Framework

Chapter 2: Literature Review

Theory & theoretical framework, empirical review

Chapter 3: Research design & methodology

- Research paradigm
- Research design
- Target pop
- Sampling procedures
- Data collection methods
- Procedures of data collection
- Data analysis
- Ethical issues in research

Section 3: References

Name of authors of books reviewed

Appendix: Plan, Budget

Quiz:

Explain probable causes of measurement error in research (5 marks)

Environmental conditions

Defective instruments

Using or reading an instrument wrongly

Quiz 2:

Quiz ①:

(a) Research title

(b) Provide main variables of the study.

Independent Variable & Factors affecting

Dependent Variable & Punctuality ↑

(c) Give a Justification for your study.
→ Justification for finding - identifying the use of resources in this academic proposal must show contribution to either existing knowledge or adding to it.

Quiz (2):

(a) Factors considered when selecting a

research problem (5 marks)

Should be researchable / verifiable - It should be one which can be investigated thru the collection & analysis of data.

(ii) Should be clear - Stated clearly & concisely

(iii) It relates to an academic discipline

(iv) Should be ethical - psychological damage to participants
(v) Sufficient data available to address it.

Describe validity showing its importance to research (5 marks).

- It determines what survey questions to use & helps ensure that researchers are using questions that truly measure the issue of importance.

Validity - extent to which a concept is accurately measured in a quantitative study.

Quiz 3

a) Sampling → Statistical analysis in which a predetermined number of observations are taken from a larger popn.

b) Discuss main samples designs commonly used in qualitative & quantitative analysis. (2 marks)

1) Simple Random Sampling - probability sampling technique where every single member of a popn is chosen randomly. Each individual has the same prob of being chosen to be a part of a sample.

i) Stratified random sampling - Method in which the researchers divide popn into smaller groups (strata) that don't overlap but rep entire popn. While sampling, these groups can be organized & then draw a sample from each group separately.

ii) Systematic sampling - Researchers use the systematic sampling method to choose members of a popn at regular intervals. It requires the selection of a starting point & the sample & sample size that can be expected at a regular interval.

i) Cluster sampling - Method where researchers divide the entire popn into sections/clusters that represent popn. Clusters are identified & included in a sample based on demographic parameters like age, sex, location etc.

Quiz 4

a) Discuss strengths & weaknesses of qualitative & quantitative research methods. (5 marks).
From solved page

Qualitative
Adv - incorporates human experience.
i) Rich in depth detail possible.
- Saves money

ii) perception of participants is considered (human factor).

Dis

i) Not a statistically representative data.

ii) may require multiple sessions

iii) Can create misleading conclusion.

Quantitative

Adv -

i) Large sample often makes conclusion generalizable.

ii) Statistical methods (Analysis considered reliable).

Dis

i) ~~Can~~ hard to understand data.

ii) ~~Diff~~ to understand context of a phenomenon.

b) Explain the purpose of literature review in any research project (5 marks).

i) provide the context for the research.

ii) Enable researcher to learn from previous theory on the subject.

iii) Highlight flaws in previous research.

iv) Outline gaps in previous research.

v) Illustrate how the subject has been studied previously.

vi) Help refine, reform or even change the topic.

vii) Ensure that the current research has not been carried out by another person.

viii) Show justify the research.

Quiz 2

1) You are conducting out a Qualitative

data analysis. Explain techniques you would use to do this. (5 marks)

i) **Content Analysis** - procedure by the

categorization of linguistic data for the purpose of description, summarization, & interpretation.

ii) **Narrative Analysis** - Reformulate stories

presented by people in different contexts

iii) **Framework Analysis** - offers researchers a systematic approach to manage, analyze & identify themes.

iv) **Discourse Analysis** - Analyzing & understanding

spoken talk (spoken interaction) & all types of written texts.

b) provide ethical issues that one needs to take into consideration during the research process. (5 marks)

i) **Informed Consent** - knowing why research is done.
- Name & title of researcher.
- Nature of research.

ii) **Privacy & Confidentiality**

iii) **Risk & Harm** - Should not endanger participants.

iv) **Integrity**

v) **Benefit**

vi) **Methods for analyzing research**

Quiz 1

a) **Themes of Research**

- **Objectivity** - How a work of objective

- **Precision** - Use precise language, discuss study.

- **Clarity** - Very good & systematic design.

- **Verifiability** - Report with other research is verifiable.

b) **Literature Review** - Is a survey of everything that has been written about a particular topic, theory, or research question.

Purpose

- Provide context for research.

- Justify the research.

- Ensure that the current research has not been covered out by another person.

- Show where research fits into existing body of knowledge.

- Enable the researcher to learn from previous theory on the subject.

- Illustrate how the subject has been studied previously.

- Highlight flaws in previous research.

- Outline gaps in previous research.

- Help refine, refocus or even change the topic.

Research