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BRANCH: CSE

DSA LAB = 1

Algorithms

pre: initialization

Step 1: Start

step 2: Initialize a variable n.

Step 3: Input value of n

Step 4: Initialize a character array name of sizen.

Step 5: Initialize an integer array marks of size n

Step 6: Initialize variable i=0

Step 7: Repeat the Steps until ixn

7.1: Input name to name array

7.2: Input marks of corresponding student to marks array

7.3: i=i+1

) average of examination marks

Step 1: Start

Step 2: Initialize variable sum=0 and average.

Step 3: Initialize variable i=0

step 4: Repeat Steps until i < n

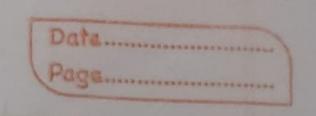
4.1: Summation of all marks Sum = Sum + marks[i]

4.2: i=i+1

Step 5 : Average = Sum /n

Step 6: Print value of average

Step7: Stop



ii) displaying names of all students whose score is below average score

step 1: Start

step 2: Initialize variable i=0

Step 3: Repeat the Steps until i < n

3.1: if marks[i] < average

print corresponding student name print corresponding student marks

3.2: i= i+1

Step 4: Stop

iii) calculate highest examination soore

step 1: Start

Step 2: Initialize variable i=0 and max_score=0

Step 3: Repeat the steps until ixn

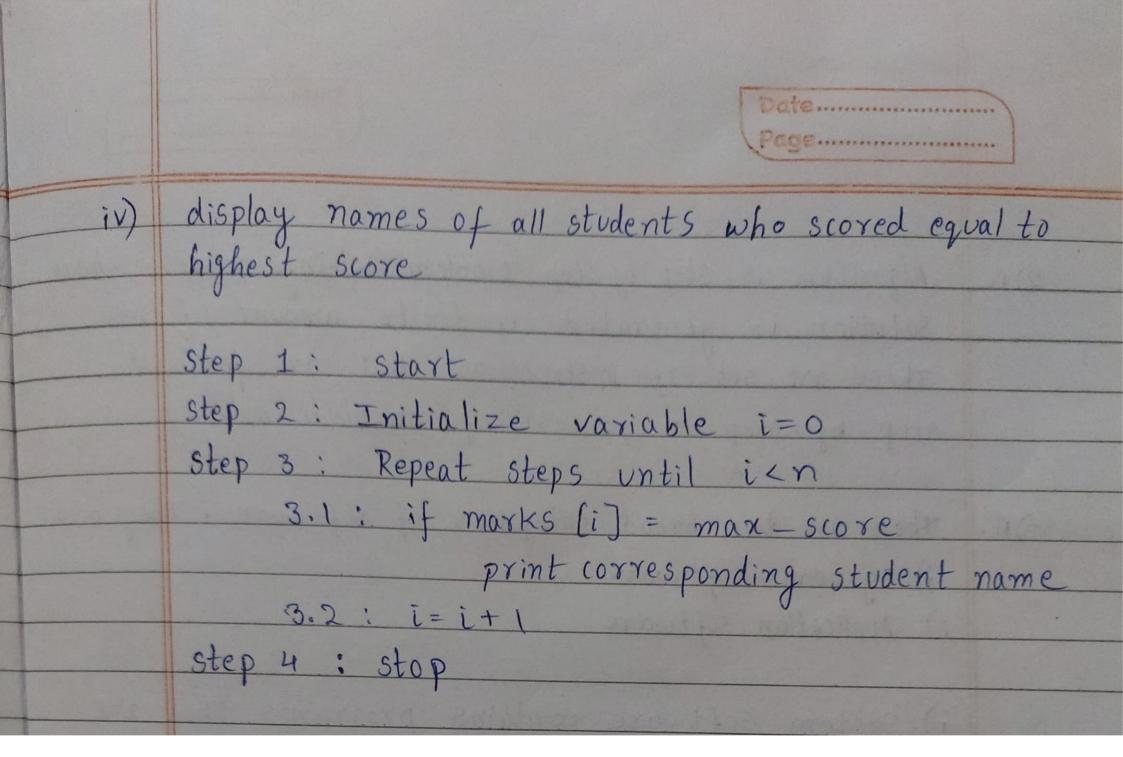
8.1: if max_score < marks[i]

Assign marks[i] value to max_score

St 3.2: i=i+1

Step 4: Print value of max-score

Step 5: Stop



Theory

i)A. Programming is a process of problem solving.

It is a way to instruct the computer to perform

various tasks. It can also be said it is a

language containing set of instructions to implement

algorithms and produce various kinds of output.

- 2) A. Algorithm is step by step problem solving process where solution is generated in finite amount of time.

 These are set of instructions that are followed step-by-step in process of problem solving.
- 3)A. There are two broad categories of software. They are

 i) System software

 ii) Application software
 - i) System software contains programs that are responsible for managing the computer such as a) Assembler
 - b) compiler
 - e) Linker & Loader
 - d) Interpreter
 - e) Text editor
 which in turn helps operating system run
 smoothly and perfectly.
 - ii) Application software is the one which perform

 Specific tasks that are specified / required to the

 Usex. The tasks can be personal, educational and

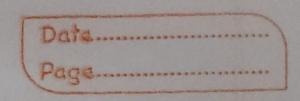
 business purpose. Some examples are ms word,

 Ms excel, web browsers etc.

	Page
4) A.	Pacie I di I
→ H.	Basic builind blocks of c++ program:
	a) variables a, name,
	b) operaters +, -, *, /, %.
	c) identifiers reserved words
	d) comments 1/ de this is c++ program
	e) data types int, float, double, char
	f) statments peclaration statements, execution statements
	g) Library # include < library name >
	with the xylanco di morrora li

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Problem solving consists mainly 3 steps.

a) Analyzing the problem

b) Implementing the problem

c) Maintaining the problem

Step 1: Analyzing the problem

· Think of a blueprint on how to solve the problem

· write pseudocode/algorithm to solve the problem

· if program is complex divide it into sub programs and write algorithm

Step 2: Implementing the problem

· Implement the algorithm and check correctness

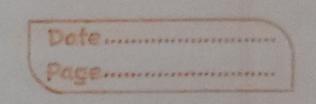
. If algorithm works write code in high-level language

· Implement the algorithm in code · Run the code and verify algorithm works.

Step 3: Maintenance of Problem

· Write code in such a way that can be easily updated for future purposes.

Use and modify the problem if problem domain changes



- 6) A. Analysis phase of programming is done by the compiler. It contains 6 phases.
 - 1) Lexical analysis
 - 2) syntax analysis
 - 3) semantic analysis
 - 4) Intermediate code generation
 - 5) Code optimization
 - 6) Final code generation.

First 3 phases carry out the main analysis of the program.

i) Lexical analysis:

Here tokenization is done, program is divided into blocks or tokens called lexemes (or) tokens.

These lexemes are keywords, identifier, terminal etc.

2) Syntax analysis:

The analyzed lexemes are brought as input here to check syntax of the language i.e., basic grammar rules to writhe the program in a language.

3) Semantic analysis:

The analyzed code after syntax analysis is input here for further analysis of meaning of the program.