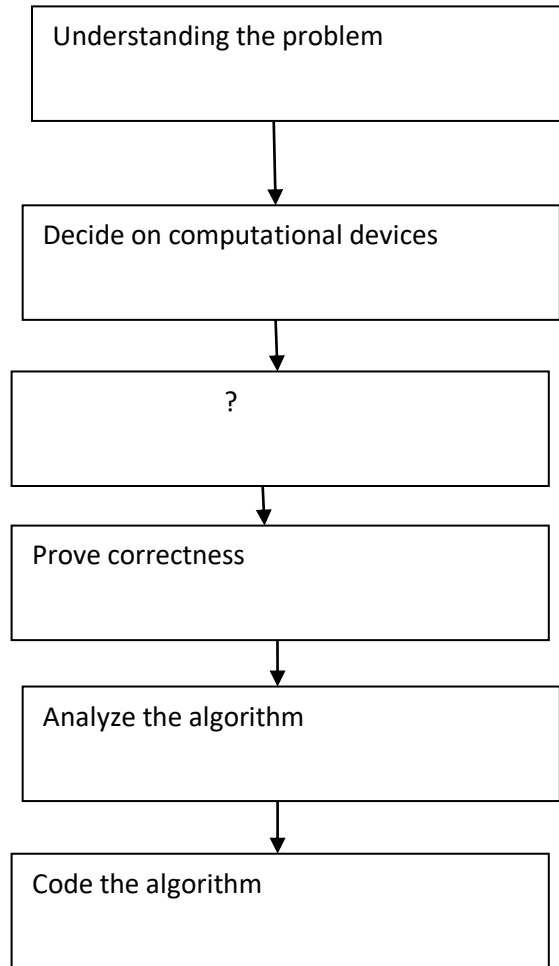Quiz question:

1. What are the three properties of algorithm?

   - Correctness

   - Termination

   - Efficiency

2. Enlist the procedure of algorithm?

   - Finite

   - Complete

   - Unique

   - Effective

3. Correctness checked measurement factors are testing and verification.

4. For each allowed input, the algorithm stops after a finite sequence of steps are known as Termination.

5. The part between do and end is called body of the loop.

6. Point out the control structures.
   - Sequence
   - Selection
   - Iteration

Diagrammatic puzzle: find the missing box and give the steps connection

```
┌─────────────────────────────────────┐
│  Understanding the problem           │
│                                      │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│  Decide on computational devices     │
│                                      │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│              ?                       │
│                                      │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│  Prove correctness                   │
│                                      │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│  Analyze the algorithm               │
│                                      │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│  Code the algorithm                  │
│                                      │
└─────────────────────────────────────┘
```
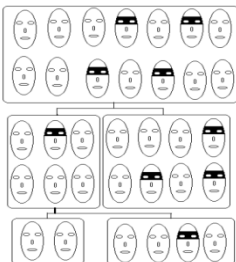
Puzzles: Important problem types
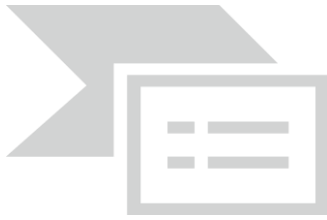
Searching

Sorting
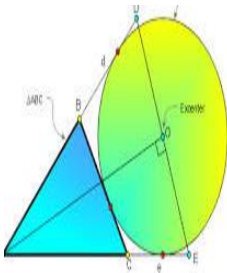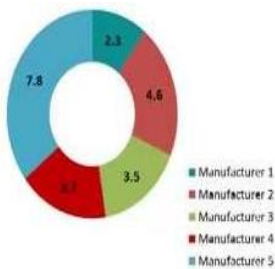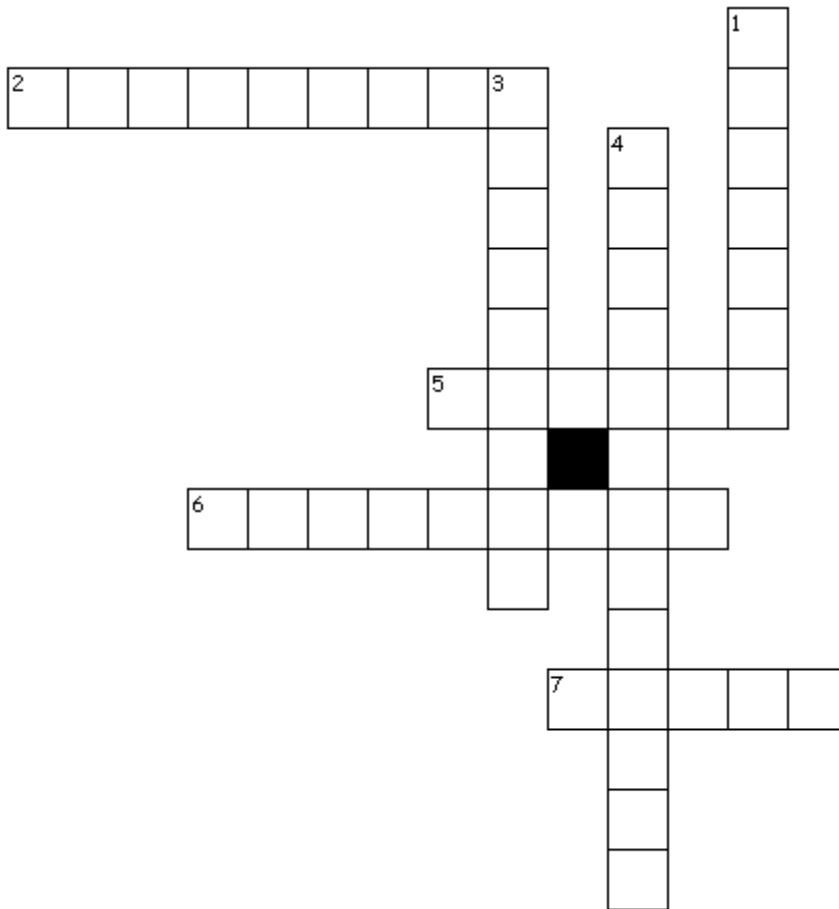
String Processing

Graph Theory

Combinatorial   Problem

Geometric problem

Numerical problem

Criss-cross puzzle

Important types of problem

Across
2. find
5. character
6. equations
7. lines

Down
1. acceding order
3. points
4. subset

ANS: sorting, searching, string, graph, combinatorial, geometric, numerical

MCQ : Fundamentals of the Analysis of Algorithm Efficiency

1. Two main measures for the efficiency of an algorithm are
a. Processor and memory
b. Complexity and capacity
c. Time and space
d. Data and space

2. The time factor when determining the efficiency of algorithm is measured by
a. Counting microseconds
b. Counting the number of key operations
c. Counting the number of statements
d. Counting the kilobytes of algorithm

3. The space factor when determining the efficiency of algorithm is measured by
a. Counting the maximum memory needed by the algorithm
b. Counting the minimum memory needed by the algorithm
c. Counting the average memory needed by the algorithm
d. Counting the maximum disk space needed by the algorithm

4. Which of the following case does not exist in complexity theory
a. Best case
b. Worst case
c. Average case
d. Null case

5. The Worst case occur in linear search algorithm when
a. Item is somewhere in the middle of the array
b. Item is not in the array at all
c. Item is the last element in the array
d. Item is the last element in the array or is not there at all

6. The Average case occur in linear search algorithm
a. When Item is somewhere in the middle of the array
b. When Item is not in the array at all
c. When Item is the last element in the array
d. When Item is the last element in the array or is not there at all

7. The complexity of the average case of an algorithm is
a. Much more complicated to analyze than that of worst case
b. Much more simpler to analyze than that of worst case
c. Sometimes more complicated and some other times simpler than that of worst case
d. None or above

Answers

1. c   2.b   3.a   4.d   5.d   6.a   7.a

Word search

Analysis of algorithm efficiency

```
G  B  P  E  L  A  B  A  A  G  T  O  Q  M  K
B  X  I  F  S  R  S  L  J  R  S  A  E  G  Q
R  F  H  F  D  Q  G  K  U  N  Y  K  L  J  K
U  N  M  I  E  O  K  R  O  W  E  M  A  R  F
U  Q  O  C  R  U  K  D  I  T  X  X  C  H  E
B  N  A  I  R  P  A  X  Y  X  E  O  I  W  T
H  P  T  E  T  T  Z  L  A  Y  H  F  T  W  L
S  H  C  N  F  A  W  L  C  K  E  G  I  V  D
M  K  O  C  H  L  R  I  K  Z  F  E  R  X  R
T  P  N  Y  G  V  J  E  R  Z  M  A  C  D  R
N  Y  G  O  B  S  B  A  P  I  L  S  W  S  R
D  N  F  H  E  X  W  Y  N  O  C  K  L  T  T
K  H  D  K  Q  M  C  X  A  V  S  I  G  W  R
T  I  M  E  N  N  O  I  O  O  I  V  F  W  E
I  T  G  F  X  E  P  H  H  L  Y  A  Y  A  Q
```

ALGORITHM	CRITICAL	EFFICIENCY
FRAMEWORK	OPERATION	SPACE
TIME		

Puzzle : Match the following

- O notation: f(n) "≥" g(n)

- Ω notation: f(n) "≤" g(n)

- Θ notation: f(n) "≤" g(n)

Answer:

2   3   1

Puzzle: Fill in the blank

- _____on parameter n indicating input size
- _____algorithm's basic operation
- _____worst, average, and best case for input of size n
- _____a recurrence relation and initial condition(s) for C(n)-the number of times the basic operation will be executed for an input of size n
- _____the recurrence to obtain a closed form or estimate the order of magnitude of the solution

- Decide

- Identify

- Determine

- Set up

- Solve