**SIMATS SCHOOL OF ENGINEERING**

**SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES**

**CHENNAI-602105**

**MINIMUM NUMBER OF WORK SESSIONS**

**A CAPSTONE PROJECT REPORT**

*Submitted in the partial fulfillment for the award of the degree of*

**BACHELOR OF ENGINEERING IN COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**

**Submitted by**

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**Under the Supervision of**

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## DECLARATION

I, Aravinth R**,** student of **Bachelor of Engineering in**

**Computer Science Engineering and Artificial Intelligence and Data Science** at Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, hereby declare that the work presented in this Capstone Project Work entitled **"Minimum number of work sessions"** is the outcome of my own bonafide work. I affirm that it is correct to the best of my knowledge, and this work has been undertaken with due consideration of Engineering Ethics.

Aravinth 192210579  
 (Name Reg No)

Date:22/09/2024

Place:Saveetha School of Engineering, Thandalam.

## CERTIFICATE

This is to certify that the project entitled **“Minimum number of work sessions”** submitted by Aravinth has been carried out under my supervision. The project has been submitted as per the requirements in the current semester of B.E Computer science engineering and B.Tech Artificial Intelligence in Data science.

Faculty-in-charge

Dr. T.Sangeetha

**ABSTRACT**

The paper explores the concept of the minimum number of work sessions required for optimal productivity. The focus is on understanding how structured, focused time blocks—known as work sessions—can enhance efficiency, prevent burnout, and promote sustained focus. By analyzing productivity techniques such as the Pomodoro Method and other time management strategies, the study aims to determine how few work sessions are needed to maintain high levels of performance while avoiding cognitive fatigue. The goal is to provide insights into the most effective duration and frequency of work sessions to balance productivity with mental well-being. Through practical applications and research on cognitive load, this study seeks to help individuals and organizations maximize output with minimal stress, promoting long-term success.

**Keywords:**

Here are some keywords for the topic:

- Work sessions

- Minimum effective work sessions

- Productivity

- Time management

- Cognitive fatigue

- Focused work

- Pomodoro Technique

- Deep work

- Mental endurance

- Task efficiency

- Cognitive load

- Burnout prevention

**INTRODUCTION**

**Introduction to work Sessions and the Minimum needed for Productivity**

Work sessions are blocks of focused, uninterrupted time used to complete tasks efficiently. The idea is rooted in the principle of breaking large tasks into smaller, more manageable pieces. A well-known approach is the **Pomodoro Technique**, where each work session typically lasts 25 minutes, followed by a short break.

**Why Focus on the Minimum Number of Work Sessions?**

Productivity can often be hampered by fatigue or lack of focus. Research shows that the human brain can only focus intensely for limited periods before attention wanes. Thus, determining the **minimum effective number of work sessions** can help balance productivity with mental endurance, allowing individuals to:

1. **Prevent Burnout:** Instead of overloading yourself with long, continuous work periods, short, focused sessions maintain energy and engagement.
2. **Enhance Focus:** Shorter sessions encourage better focus, helping to minimize distractions.
3. **Achieve Consistency:** Knowing the minimum amount of time needed daily can help create a sustainable routine.

**How to Determine the Minimum Number of Work Sessions?**

The number of work sessions required depends on the complexity of tasks, personal productivity levels, and individual work capacity. For some, 3-4 focused sessions (e.g., 90-120 minutes of deep work) may be enough to achieve significant progress. Others might find that more or fewer sessions work best for their goals.Finding the right balance is key, ensuring that each work session is productive without overwhelming yourself.

**CODING**

#include <stdio.h>

#include <limits.h>

#define MAXN 14 // Maximum number of tasks (since 2^14 = 16384 which fits in memoization array)

#define MAX\_MASK (1 << MAXN) // Maximum bitmask for up to 14 tasks

int memo[MAX\_MASK]; // Memoization array for DP

int tasks[MAXN]; // Task durations

int n; // Number of tasks

int sessionTime; // Session time limit

// Function to calculate the sum of tasks in a given mask

int getTaskSum(int mask) {

int sum = 0;

for (int i = 0; i < n; i++) {

if (mask & (1 << i)) {

sum += tasks[i];

}

}

return sum;

}

// DP function to compute the minimum sessions for a given mask

int dp(int mask) {

if (mask == 0) return 0; // No tasks left, so no session needed

if (memo[mask] != -1) return memo[mask]; // Return memoized result

int min\_sessions = INT\_MAX;

// Try every subset of the current mask

for (int subset = mask; subset > 0; subset = (subset - 1) & mask) {

if (getTaskSum(subset) <= sessionTime) {

min\_sessions = (min\_sessions < 1 + dp(mask ^ subset)) ? min\_sessions : 1 + dp(mask ^ subset);

}

}

memo[mask] = min\_sessions;

return min\_sessions;

}

int minSessions(int\* tasksArray, int tasksSize, int sessionTimeInput) {

// Initialize tasks, n, and sessionTime

n = tasksSize;

sessionTime = sessionTimeInput;

// Copy tasksArray to tasks

for (int i = 0; i < n; i++) {

tasks[i] = tasksArray[i];

}

// Initialize memoization array to -1 (uncomputed)

for (int i = 0; i < (1 << n); i++) {

memo[i] = -1;

}

// Start the DP with all tasks represented by the full mask

return dp((1 << n) - 1);

}

int main() {

// Example 1

int tasks1[] = {1, 2, 3};

int sessionTime1 = 3;

printf("Example 1: Minimum sessions = %d\n", minSessions(tasks1, 3, sessionTime1)); // Output: 2

// Example 2

int tasks2[] = {3, 1, 3, 1, 1};

int sessionTime2 = 8;

printf("Example 2: Minimum sessions = %d\n", minSessions(tasks2, 5, sessionTime2)); // Output: 2

return 0;

}

### OUTPUT

Example 1: Minimum sessions = 2

Example 2: Minimum sessions = 2

For **Example 1** (tasks = [1, 2, 3], sessionTime = 3):

* The tasks can be finished in two sessions: 1+2 in the first session and 3 in the second session.

For **Example 2** (tasks = [3, 1, 3, 1, 1], sessionTime = 8):

* The tasks can be finished in two sessions: 3+1+3+1 in the first session and 1 in the second session.

**Complexity Analysis**

### ****BEST CASE ANALYSIS****

In the best case, the individual is highly focused, the tasks are well-defined and within their capabilities, and there are minimal distractions.

* **Best Case:** **O(1)** session.
  + The task is simple or clear enough that it can be completed in a single, highly productive work session.
  + Factors: Full focus, no interruptions, high motivation, and energy levels.
  + Example: A straightforward task that can be accomplished in a single 25–45 minute focused session.

### ****WORST CASE ANALYSIS****

In the worst case, the task is highly complex or ambiguous, frequent distractions occur, or the individual experiences low energy or motivation.

* **Worst Case:** **O(n)** sessions, where n could be very large.
  + The task is so complicated, requires deep thought, or is frequently interrupted, causing productivity to decrease significantly.
  + Factors: High complexity, interruptions, poor focus, and mental fatigue.
  + Example: A large or complicated project with unclear requirements, causing repeated interruptions, backtracking, or mental exhaustion.

### ****AVERAGE CASE ANALYSIS****

In an average scenario, the task complexity is moderate, there are occasional distractions, and the individual's focus and energy levels vary.

* **Average Case:** **O(log n)** sessions, where n is the complexity or size of the task.
  + The individual can make steady progress, but occasional interruptions or fatigue reduce efficiency. The task might require a few sessions to complete, but is manageable with proper breaks.
  + Factors: Moderate task complexity, occasional distractions, average focus and energy.
  + Example: A multi-step task that can be broken into smaller parts, completed in a few sessions with some interruptions.

CONCLUSION

The minimum number of work sessions needed to complete a task is influenced by several key factors. First, the complexity and size of the task itself play a major role—more complex tasks typically require more time and therefore more sessions. Second, the efficiency with which you can work during each session impacts how much you can accomplish in one sitting. If you can maintain high levels of focus and productivity, you may be able to reduce the total number of sessions. Third, your ability to sustain concentration without losing productivity determines how long each session can last, which in turn affects how many sessions you’ll need.

To minimize the number of work sessions, it is important to maximize productivity by working in focused blocks of time while minimizing distractions. However, balancing this with adequate rest between sessions is crucial to avoid fatigue and burnout. For simpler tasks, one or two focused sessions might be sufficient. In contrast, larger or more complex projects could require several work sessions, distributed across multiple days or weeks depending on deadlines and the workload involved.

Ultimately, determining the minimum number of work sessions requires considering these factors together. By carefully balancing task size, time availability, work habits, and productivity levels, you can find the optimal number of sessions required to complete the task efficiently while maintaining performance quality.