**DATA STRUCTURES AND ALGORITHM LAB**

**INTERNAL ASSESSMENT**

**TOPIC: JOSHEPHUS PROBLEM**

**SUBJECT CODE: 20CP201P**

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**PROBLEM:**

Consider the following variation of the Josephus problem. A group of people stand in a

A circle and each chooses a positive integer. One of their names and a positive integer n

are chosen. Starting with the person whose name is chosen, they count around the circle

clockwise and eliminate the nth person. The positive integer that that person chose is

then used to continue the count. Each time that a person is eliminated, the number that

he or she chose is used to determine the next person eliminated.

**For example:**

Suppose that the five people are A, B, C, D, and E and that they choose integers 3, 4, 6 , 2, and

7, respectively, and that the integer 2 is initially chosen. Then if we start from A, the

order in which people are eliminated from the circle is B. A, E, C, leaving D as the last

one in the circle

Write a program that reads a group of input lines. Each input line except the first and last

contains a name and a positive integer chosen by that person. The.order of the names

in the data is the clockwise ordering of the people in the circle, and the count is to start

with the first name in the input. The first input line contains the number of people in

the circle. The last input line contains only a single positive integer representing the

initial count. The program prints the order in which the people are eliminated from the

circle.

**THEORY:**

**SOURCE CODE:**

#include <stdio.h>

#include <stdlib.h>

#include <string.h>

struct Person {

char name[20];

int chosen\_integer;

struct Person\* next;

};

struct Person\* create\_person(char name[], int chosen\_integer) {

struct Person\* new\_person = (struct Person\*)malloc(sizeof(struct Person));

strcpy(new\_person->name, name);

new\_person->chosen\_integer = chosen\_integer;

new\_person->next = NULL;

return new\_person;

}

struct Person\* insert\_person(struct Person\* head, char name[], int chosen\_integer) {

struct Person\* new\_person = create\_person(name, chosen\_integer);

if (head == NULL) {

new\_person->next = new\_person;

return new\_person;

}

struct Person\* current = head;

while (current->next != head) {

current = current->next;

}

current->next = new\_person;

new\_person->next = head;

return head;

}

void eliminate\_person(struct Person\* head, int count) {

if (head == NULL) {

return;

}

struct Person\* current = head;

struct Person\* prev = NULL;

do {

for (int i = 1; i < count; i++) {

prev = current;

current = current->next;

}

if (prev != NULL) {

prev->next = current->next;

} else {

head = current->next;

}

printf("%s\n", current->name);

count = current->chosen\_integer;

free(current);

current = prev->next;

} while (current->next != current);

printf("the last one in the circle %s\n", current->name);

}

int main() {

int num\_people, initial\_count;

printf("enter the no of people:");

scanf("%d", &num\_people);

struct Person\* ptr = NULL;

for (int i = 0; i < num\_people; i++) {

char name[20];

int chosen\_integer;

printf("enter name and number:");

scanf("%s %d", name, &chosen\_integer);

ptr = insert\_person(ptr, name, chosen\_integer);

}

printf("enter the value of initial count:");

scanf("%d", &initial\_count);

eliminate\_person(ptr, initial\_count);

    return 0;

}

**APPLICATION:**

**PICTURE:**