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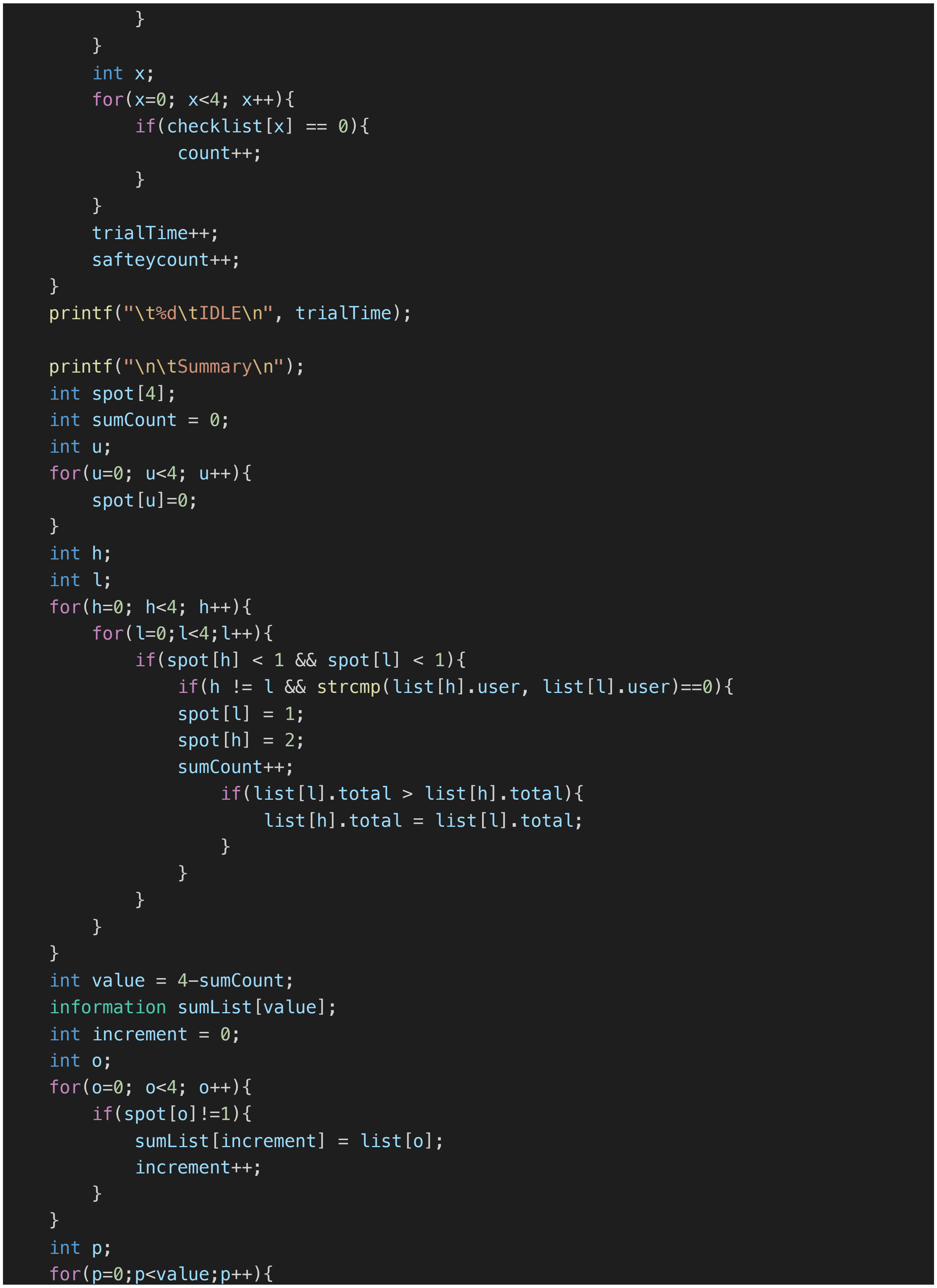
```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <limits.h>
#include <time.h>

typedef struct information
{
    char user[50];
    char process;
    int arrival;
    int duration;
    int total;
} information;

information *init(char * userInput, char processInput, int arrivalInput, int
durationInput);
void cpuScheduling(information * list);
information * preemption(information *list, int time);
int freeList(information * list);
void printOutput(information * list);


int main(){
    char *trashCollector = NULL;
    // this a pointer to the headers which would be taking into account but not used.
    information *processList;
    if((processList = malloc(4*sizeof(information)))==NULL){
        return 1;
    }
int d;
for(d=0; d<5; d++){
    scanf("%s\t", trashCollector);
}

int i;
for (i = 0; i < 4; i++){
    char expectedName[50] = "/0";
    char expectedProcess = 'a';
    int expectedArrival = 0;
    int expectedDuration = 0;
    if(scanf("%s\t%c\t%d\t%d",expectedName, &expectedProcess, &expectedArrival,
&expectedDuration)){
        printf("Error in scanning the data");
        return 1;
    }
    // Create an initialize function to help store the iincoming data in the structs
    information *newStorage;
    newStorage = init(expectedName, expectedProcess, expectedArrival,
expectedDuration);
    processList[i] = *newStorage;
}
    cpuScheduling(processList);
    freeList(processList);
    return 0;
}

information *init(char * userInput, char processInput, int arrivalInput, int
durationInput){
    information * current;
    if((current = malloc(sizeof(information))) == NULL)
    {
        return NULL;
    }
    strcpy(current->user, userInput);
    current->process = processInput;
    current->arrival = arrivalInput;
    current->duration = durationInput;
    return current;
}

void cpuScheduling(information *list){
    int checklist[4];
    int trialTime = 0;
    int count = 0;
    int safteycount = 0;
    int f;

    for(f=0; f<4; f++){
        checklist[f] = 1;
    }

    printf("This Would Result in:\n\tTime\tJob\n");

    while(count !=4 && safteycount != 100){
        information * temp;
        temp = preemption(list, trialTime);
        list = temp;
        count = 0;

        //empty check
        int e;
        for(e=0; e<4; e++){
            if(list[e].duration == 0 && checklist[e]!=0){
                checklist[e] = 0;
```



```
            }
        }
        int x;
        for(x=0; x<4; x++){
            if(checklist[x] == 0){
                count++;
            }
        }
        trialTime++;
        safteycount++;
    }
    printf("\t%d\tIDLE\n", trialTime);

    printf("\n\tSummary\n");
    int spot[4];
    int sumCount = 0;
    int u;
    for(u=0; u<4; u++){
        spot[u]=0;
    }
    int h;
    int l;
    for(h=0; h<4; h++){
        for(l=0;l<4;l++){
            if(spot[h] < 1 && spot[l] < 1){
                if(h != l && strcmp(list[h].user, list[l].user)==0){
                spot[l] = 1;
                spot[h] = 2;
                sumCount++;
                    if(list[l].total > list[h].total){
                        list[h].total = list[l].total;
                    }
                }
            }
        }
    }
    int value = 4-sumCount;
    information sumList[value];
    int increment = 0;
    int o;
    for(o=0; o<4; o++){
        if(spot[o]!=1){
            sumList[increment] = list[o];
            increment++;
        }
    }
    int p;
    for(p=0;p<value;p++){
```

```c
        printf("\t%s\t%d\n", sumList[p].user, sumList[p].total+1);
    }


}

information * preemption(information *list, int time){
    int minDuration = 999;
    int processLoc;
    int check = 0;
    int j;
    for(j=0;j<4;j++){
        if(list[j].arrival <= time){
            if(list[j].duration < minDuration && list[j].duration != 0){
                minDuration = list[j].duration;
                processLoc = j;
                check++;
            }
        }
    }
    if(check != 0){
        list[processLoc].duration = list[processLoc].duration - 1;
        list[processLoc].total = time;
        printf("\t%d\t%c\n", time, list[processLoc].process);
    }
    return list;
}

int freeList(information *list){
    free(list);
    return 1;
}

void printOutput(information * in){
    int j;
    for(j=0;j<4;j++){
        printf("%s\t%c\t%d\t%d\n", in[j].user, in[j].process, in[j].arrival,
in[j].duration);
    }
}
```