BATCH-68

BTECH CSE

TEAM MEMBERS:

KALYAN RAM[590027112]

NAVEEN KUMAR[590025871]

C-PROJECT

EMPLOYEE SALARY MANAGEMENT SYSTEM

REPORT

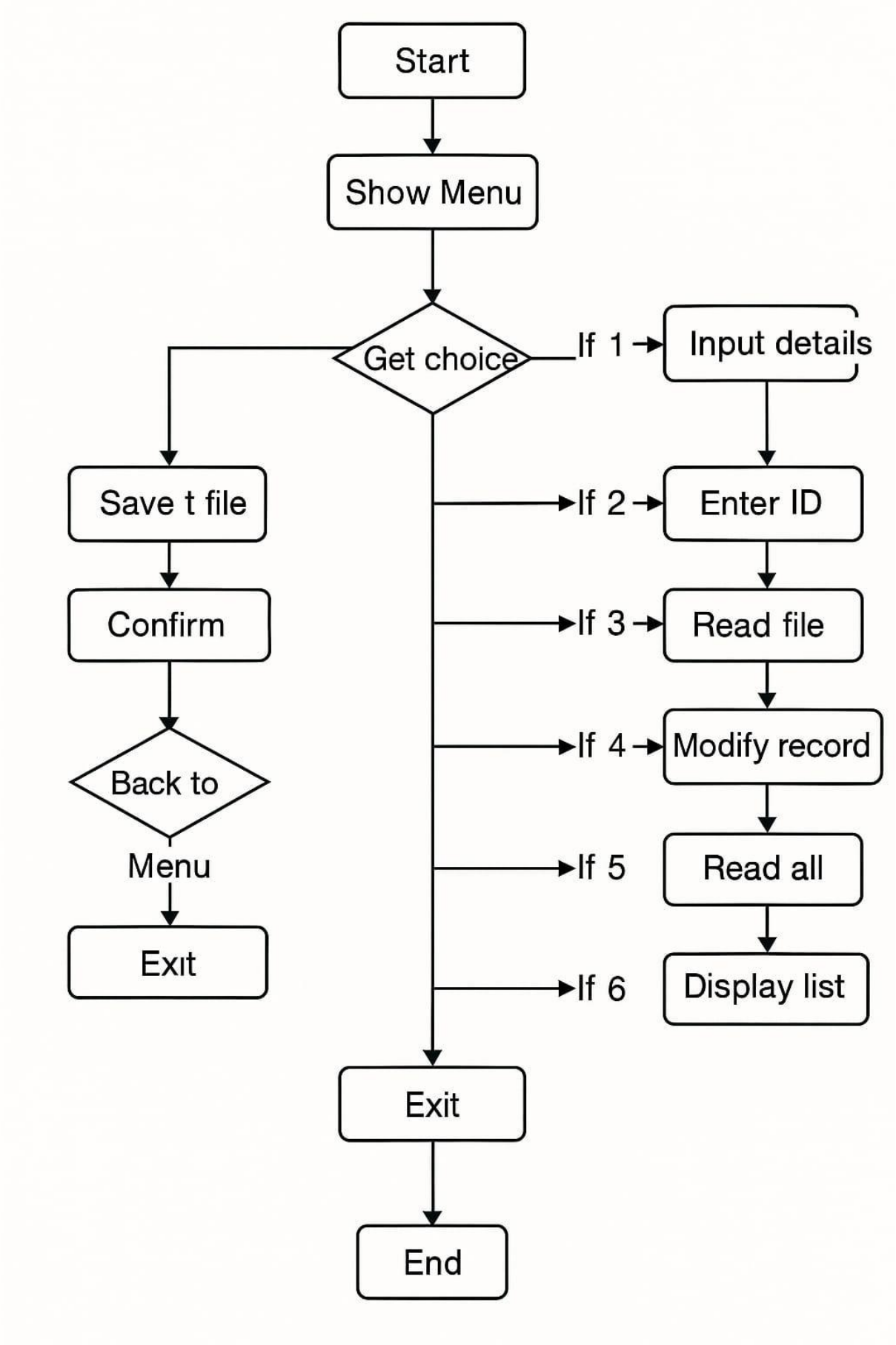
1. Problem definition

Create a small console-based Employee Salary Management System in C that can:

- Store employee records (ID, name, basic salary, allowances, deductions).
- Calculate gross salary, net salary and optionally tax.
- Add, view, update, and delete employee records (simple file-based persistence).
- Display a payslip for a single employee.

This project is aimed at demonstrating modular C programming using a header file and implementation file, simple file I/O for persistence, and a menu-driven interface.

2. Flowchart



3. Algorithm (high-level)

1. Start program and open (or create) data file employees.dat in binary append/read mode when needed.
2. Present menu to user.
3. For Add Employee: Get employee details, compute derived fields (gross, net), append record to file.
4. For View Employee: Scan records for the given ID and show employee's payslip.
5. For Update Employee: Read all records, modify the matching record, write back updated list (temporary file technique).
6. For Delete Employee: Same as update but exclude the matching record when rewriting file.
7. For List All: Read and print brief information for each record.
8. Loop until user chooses Exit.
9. Close file and terminate.

4. Problems faced by the group (2 members)

Member A: Implementing safe file update (atomic rewrite) and ensuring no data loss when updating/deleting records.

Member B: Designing clear input validation for salary fields and formatting the payslip output uniformly.

Work distribution suggestion:

Member A: File I/O, record storage format, update/delete functions.

Member B: User interface, validation, payslip formatting, testing.

5. Code:

Main.cpp

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "salary.h"

#define DATAFILE "employees.dat"

// --- Helper Functions ---

// Reads an integer and cleans the input buffer
int input_int(const char *prompt) {
```

```
    int val;
    printf("%s", prompt);
    if (scanf("%d", &val) != 1) {
        // Invalid input, clear buffer and return a default or
error value
        while (getchar() != '\n');
        return -1; // Indicate error
    }
    // consume remaining newline or characters in buffer
    while (getchar() != '\n');
    return val;
}

// Reads a string, removing the newline character
void input_string(const char *prompt, char *buffer, int size)
{
    printf("%s", prompt);
    if (fgets(buffer, size, stdin) != NULL) {
        size_t len = strlen(buffer);
        if (len > 0 && buffer[len - 1] == '\n') {
            buffer[len - 1] = '\0';
        }
    }
```

```
}

// --- Implementations of Functions from salary.h ---

void compute_salary(Employee *e) {
    e->gross = e->basic + e->allowances;
    e->net = e->gross - e->deductions;
}

bool add_employee(const Employee *e, const char *filename)
{
    FILE *file = fopen(filename, "ab");  // Append binary
    if (!file) return false;
    if (fwrite(e, sizeof(Employee), 1, file) != 1) {
        fclose(file);
        return false;
    }
    fclose(file);
    return true;
}

bool find_employee(int id, Employee *out, const char
*filename) {
```

```
    FILE *file = fopen(filename, "rb");
    if (!file) return false;
    Employee temp;
    while (fread(&temp, sizeof(Employee), 1, file) == 1) {
        if (temp.id == id) {
            *out = temp;
            fclose(file);
            return true;
        }
    }
    fclose(file);
    return false;
}

bool update_employee(const Employee *e, const char
*filename) {
    FILE *file = fopen(filename, "r+b");
    if (!file) return false;
    Employee temp;
    long pos;
    while ((pos = ftell(file)) != -1 && fread(&temp,
sizeof(Employee), 1, file) == 1) {
        if (temp.id == e->id) {
```

```
            fseek(file, pos, SEEK_SET);
            if (fwrite(e, sizeof(Employee), 1, file) != 1) {
                fclose(file);
                return false;
            }
            fclose(file);
            return true;
        }
    }
    fclose(file);
    return false;
}

bool delete_employee(int id, const char *filename) {
    FILE *file = fopen(filename, "rb");
    if (!file) return false;
    FILE *temp_file = fopen("temp.dat", "wb");
    if (!temp_file) {
        fclose(file);
        return false;
    }
    Employee temp;
```

```
    bool found = false;
    while (fread(&temp, sizeof(Employee), 1, file) == 1) {
        if (temp.id != id) {
            fwrite(&temp, sizeof(Employee), 1, temp_file);
        } else {
            found = true;
        }
    }
    fclose(file);
    fclose(temp_file);
    if (found) {
        remove(filename);
        rename("temp.dat", filename);
    } else {
        remove("temp.dat");
    }
    return found;
}

void list_employees(const char *filename) {
    FILE *file = fopen(filename, "rb");
    if (!file) {
```

```
        printf("No employees found or file error.\n");
        return;
    }
    Employee e;
    printf("\n--- All Employees ---\n");
    while (fread(&e, sizeof(Employee), 1, file) == 1) {
        printf("ID: %d, Name: %s, Basic: %.2f, Allowances: %.2f,
Deductions: %.2f, Gross: %.2f, Net: %.2f\n",
                e.id, e.name, e.basic, e.allowances, e.deductions,
e.gross, e.net);
    }
    fclose(file);
}

// --- Menu Actions ---

void do_add() {
    Employee e;
    printf("\n--- Add New Employee ---\n");
    e.id = input_int("Enter ID: ");
    if (e.id == -1) {
        printf("Invalid ID entered.\n");
        return;
```

```
    }

    // Check if ID already exists
    Employee dummy;
    if (find_employee(e.id, &dummy, DATAFILE)) {
        printf("Error: Employee with ID %d already exists.\n",
e.id);
        return;
    }

    input_string("Enter Name: ", e.name, NAME_LEN);

    printf("Enter Basic Salary: ");
    if (scanf("%lf", &e.basic) != 1) {
        printf("Invalid input for basic salary.\n");
        while (getchar() != '\n');
        return;
    }
    printf("Enter Allowances: ");
    if (scanf("%lf", &e.allowances) != 1) {
        printf("Invalid input for allowances.\n");
        while (getchar() != '\n');
```

```
        return;
    }
    printf("Enter Deductions: ");
    if (scanf("%lf", &e.deductions) != 1) {
        printf("Invalid input for deductions.\n");
        while (getchar() != '\n');
        return;
    }
    while (getchar() != '\n');  // clear buffer after double inputs

    compute_salary(&e);

    if (add_employee(&e, DATAFILE)) {
        printf("Employee added successfully.\n");
    } else {
        printf("Failed to add employee.\n");
    }
}

void do_view() {
    int id = input_int("Enter employee ID to view: ");
    if (id == -1) {
```

```
        printf("Invalid ID entered.\n");
        return;
    }
    Employee e;
    if (find_employee(id, &e, DATAFILE)) {
        printf("\n=== PAYSLIP ===\n");
        printf("ID:         %d\n", e.id);
        printf("Name:       %s\n", e.name);
        printf("Basic:      %.2f\n", e.basic);
        printf("Allowances: %.2f\n", e.allowances);
        printf("Deductions: %.2f\n", e.deductions);
        printf("-------------\n");
        printf("GROSS:      %.2f\n", e.gross);
        printf("NET SALARY: %.2f\n", e.net);
        printf("==============\n");
    } else {
        printf("Employee not found.\n");
    }
}

void do_update() {
    int id = input_int("Enter employee ID to update: ");
```

```
    if (id == -1) {
        printf("Invalid ID entered.\n");
        return;
    }
    Employee e;
    if (!find_employee(id, &e, DATAFILE)) {
        printf("Employee not found.\n");
        return;
    }

    printf("\nUpdating employee %s (ID %d)\n", e.name, e.id);

    // Handle name update (allow blank to keep existing)
    char name_buffer[NAME_LEN];
    input_string("Enter new name (leave blank to keep): ",
name_buffer, NAME_LEN);
    if (strlen(name_buffer) > 0) {
        strcpy(e.name, name_buffer);
    }

    // Handle numeric updates
    printf("Enter new basic salary (current %.2f): ", e.basic);
```

```
    double temp_d;
    if (scanf("%lf", &temp_d) == 1) e.basic = temp_d;

    printf("Enter new allowances (current %.2f): ",
e.allowances);
    if (scanf("%lf", &temp_d) == 1) e.allowances = temp_d;

    printf("Enter new deductions (current %.2f): ",
e.deductions);
    if (scanf("%lf", &temp_d) == 1) e.deductions = temp_d;

    while (getchar() != '\n');  // clear buffer

    compute_salary(&e);

    if (update_employee(&e, DATAFILE))
        printf("Employee updated successfully.\n");
    else
        printf("Failed to update.\n");
}

void do_delete() {
    int id = input_int("Enter employee ID to delete: ");
```

```
    if (id == -1) {
        printf("Invalid ID entered.\n");
        return;
    }
    if (delete_employee(id, DATAFILE))
        printf("Employee deleted.\n");
    else
        printf("Failed to delete (ID not found?).\n");
}

void do_list() {
    list_employees(DATAFILE);
}

int main(void) {
    int choice;
    do {
        printf("\nEmployee Salary Management\n");
        printf("1. Add Employee\n");
        printf("2. View Employee / Payslip\n");
        printf("3. Update Employee\n");
        printf("4. Delete Employee\n");
```

```
        printf("5. List All Employees\n");
        printf("6. Exit\n");

        choice = input_int("Choose an option: ");
        if (choice == -1) {
            printf("Invalid choice.\n");
            continue;
        }

        switch (choice) {
            case 1: do_add(); break;
            case 2: do_view(); break;
            case 3: do_update(); break;
            case 4: do_delete(); break;
            case 5: do_list(); break;
            case 6: printf("Exiting...\n"); break;
            default: printf("Invalid option.\n");
        }
    } while (choice != 6);
    return 0;
}
```

Salary.c

```
#include <stdio.h>  // Added for FILE and printf (good practice, even if salary.h includes it)
#include  <stdlib.h>
#include  <string.h>
#include "salary.h"

// Compute gross and net.
// Gross = basic + allowances; Net = gross - deductions
void compute_salary(Employee *e) {
    e->gross = e->basic + e->allowances;
    e->net = e->gross - e->deductions;
}

bool add_employee(const Employee *e, const char *filename)
{
    FILE *fp = fopen(filename, "ab");
    if (!fp) return false;

    if (fwrite(e, sizeof(Employee), 1, fp) != 1) {
        fclose(fp);
        return false;
    }
```

```
    fclose(fp);
    return true;
}

bool find_employee(int id, Employee *out, const char
*filename) {
    FILE *fp = fopen(filename, "rb");
    if (!fp) return false;

    Employee tmp;
    bool found = false;
    while (fread(&tmp, sizeof(Employee), 1, fp) == 1) {
        if (tmp.id == id) {
            *out = tmp;
            found = true;
            break;
        }
    }
    fclose(fp);
    return found;
}
```

```
bool update_employee(const Employee *e, const char
*filename) {
    FILE *fp = fopen(filename, "rb");
    if (!fp) return false;

    FILE *tf = fopen("temp.dat", "wb");
    if (!tf) {
        fclose(fp);
        return false;
    }

    Employee tmp;
    bool found = false;

    while (fread(&tmp, sizeof(Employee), 1, fp) == 1) {
        if (tmp.id == e->id) {
            // Write the new (updated) employee data
            fwrite(e, sizeof(Employee), 1, tf);
            found = true;
        } else {
            // Write existing data
            fwrite(&tmp, sizeof(Employee), 1, tf);
```

```
        }
    }

    fclose(fp);
    fclose(tf);

    if (found) {
        remove(filename);
        rename("temp.dat", filename);
        return true;
    } else {
        remove("temp.dat");
        return false;
    }
}

bool delete_employee(int id, const char *filename) {
    FILE *fp = fopen(filename, "rb");
    if (!fp) return false;

    FILE *tf = fopen("temp.dat", "wb");
    if (!tf) {
```

```
        fclose(fp);
        return false;
    }

    Employee tmp;
    bool found = false;

    while (fread(&tmp, sizeof(Employee), 1, fp) == 1) {
        if (tmp.id == id) {
            found = true;
            // Do not write this record to temp file (effectively deleting it)
        } else {
            fwrite(&tmp, sizeof(Employee), 1, tf);
        }
    }

    fclose(fp);
    fclose(tf);

    if (found) {
        remove(filename);
```

```
        rename("temp.dat", filename);
        return true;
    } else {
        remove("temp.dat");
        return false;
    }
}

void list_employees(const char *filename) {
    FILE *fp = fopen(filename, "rb");
    if (!fp) {
        printf("No data found or file error.\n");
        return;
    }

    Employee e;
    printf("\n%-5s %-20s %-10s %-10s %-10s %-10s %-10s\n",
           "ID", "Name", "Basic", "Allow", "Deduct", "Gross",
"Net");
    printf("----------------------------------------------------
----------\n");
    while (fread(&e, sizeof(Employee), 1, fp) == 1) {
```

```
        printf("%-5d %-20s %-10.2f %-10.2f %-10.2f %-10.2f %-10.2f\n",
               e.id, e.name, e.basic, e.allowances, e.deductions, e.gross, e.net);
    }
    printf("------------------------------------------------------------------\n");
    fclose(fp);
}
```

Salary.h

main2.cpp | salaryy.c | salaryyy.h

```
#ifndef SALARY_H
#define SALARY_H

#include <stdio.h>
#include <stdbool.h>
#include <string.h>  // Added for potential string operations in implementations

#define NAME_LEN 50

typedef struct {
    int id;
    char name[NAME_LEN];
    double basic;
    double allowances;  // Other allowances
    double deductions;  // Other deductions
    double gross;       // Computed gross salary
    double net;         // Computed net salary
} Employee;

// File operations
bool add_employee(const Employee *e, const char *filename);
bool find_employee(int id, Employee *out, const char *filename);
bool update_employee(const Employee *e, const char *filename);
bool delete_employee(int id, const char *filename);
void list_employees(const char *filename);

// Calculations
void compute_salary(Employee *e);

#endif // SALARY_H
```

OUTPUT:

```
Enter Deductions: 200000
Employee added successfully.

Employee Salary Management
1. Add Employee
2. View Employee / Payslip
3. Update Employee
4. Delete Employee
5. List All Employees
6. Exit
Choose an option: 5

--- All Employees ---
ID: 590027112, Name: Kalyan, Basic: 10000000.00, Allowances: 5000000.00, Deductions: 200000.00, Gross: 15000000.00, Net: 14800000.00
ID: 33000, Name: max_verstappen, Basic: 75000000.00, Allowances: 5000000.00, Deductions: 2000000.00, Gross: 80000000.00, Net: 78000000.00
ID: 78900, Name: praneeth, Basic: 20000000.00, Allowances: 350000.00, Deductions: 200000.00, Gross: 20350000.00, Net: 20150000.00
ID: 987, Name: praneeth, Basic: 20000000.00, Allowances: 300000.00, Deductions: 200000.00, Gross: 20300000.00, Net: 20100000.00

Employee Salary Management
1. Add Employee
2. View Employee / Payslip
3. Update Employee
4. Delete Employee
5. List All Employees
6. Exit
Choose an option: 6
Exiting...

--------------------------------
Process exited after 55.77 seconds with return value 0
Press any key to continue . . .
```