Question 5

```
#include <stdio.h>
#include <string.h>

#define MAX_BOOKS 100

struct book {
    int accession_number;
    char author[50];
    char title[100];
    int is_issued;
};


struct book library[MAX_BOOKS];


int num_books = 0;


void display_book(struct book b) {
    printf("Accession Number: %d\n", b.accession_number);
    printf("Author: %s\n", b.author);
    printf("Title: %s\n", b.title);
    printf("Issued: %s\n", b.is_issued ? "Yes" : "No");
    printf("\n");
}


void add_book() {
    struct book new_book;

    printf("Enter Accession Number: ");
    scanf("%d", &new_book.accession_number);
    printf("Enter Author Name: ");
    scanf("%s", new_book.author);
    printf("Enter Book Title: ");
    scanf("%s", new_book.title);
    new_book.is_issued = 0;

    library[num_books++] = new_book;

    printf("Book added successfully!\n\n");
}
```

```
void display_books_by_author() {
    char author[50];

    printf("Enter Author Name: ");
    scanf("%s", author);

    int found = 0;

    printf("Books by Author '%s':\n", author);

    for (int i = 0; i < num_books; i++) {
        if (strcmp(library[i].author, author) == 0) {
            display_book(library[i]);
            found = 1;
        }
    }

    if (!found) {
        printf("No books found by author '%s'\n\n", author);
    }
}


void display_num_books_by_title() {
    char title[100];

    printf("Enter Book Title: ");
    scanf("%s", title);

    int count = 0;

    for (int i = 0; i < num_books; i++) {
        if (strcmp(library[i].title, title) == 0) {
            count++;
        }
    }

    printf("Number of Books with Title '%s': %d\n\n", title, count);
}


void display_total_books() {
```

```
    printf("Total Number of Books: %d\n\n", num_books);
}


void issue_book() {
    int accession_number;

    printf("Enter Accession Number: ");
    scanf("%d", &accession_number);

    int found = 0;

    for (int i = 0; i < num_books; i++) {
        if (library[i].accession_number == accession_number) {
            if (library[i].is_issued) {
                printf("This book is already issued!\n\n");
            } else {
                library[i].is_issued = 1;
                printf("Book Issued Successfully!\n\n");
            }
            found = 1;
            break;
        }
    }

    if (!found) {
        printf("No book found with Accession Number '%d'\n\n", accession_number);
    }
}


int main() {

do {
    printf("MENU\n");
    printf("1. Display Book Information\n");
    printf("2. Add a New Book\n");
    printf("3. Display All Books by Author\n");
    printf("4. Display Number of Books by Title\n");
    printf("5. Display Total Number of Books\n");
    printf("6. Issue a Book\n");
    printf("7. Exit\n");
    printf("Enter Choice: ");
```

```
scanf("%d", &choice);

switch (choice) {
    case 1:
        if (num_books == 0) {
            printf("No books in the library!\n\n");
        } else {
            int accession_number;

            printf("Enter Accession Number: ");
            scanf("%d", &accession_number);

            int found = 0;

            for (int i = 0; i < num_books; i++) {
                if (library[i].accession_number == accession_number) {
                    display_book(library[i]);
                    found = 1;
                    break;
                }
            }

            if (!found) {
                printf("No book found with Accession Number '%d'\n\n", accession_number);
            }
        }
        break;
    case 2:
        add_book();
        break;
    case 3:
        display_books_by_author();
        break;
    case 4:
        display_num_books_by_title();
        break;
    case 5:
        display_total_books();
        break;
    case 6:
        issue_book();
        break;
    case 7:
        printf("Exiting program...\n");
```

```
            break;
        default:
            printf("Invalid Choice! Try Again.\n\n");
            break;
    }
} while (choice != 7);

return 0;
}
```

Question 6

```
#include <stdio.h>
#include <string.h>

struct employee {
    char name[50];
    float salary;
    float hours_worked_per_day;
};

int main() {
    struct employee employees[10];


    for (int i = 0; i < 10; i++) {
        printf("Enter name of employee %d: ", i+1);
        scanf("%s", employees[i].name);
        printf("Enter salary of employee %d: ", i+1);
        scanf("%f", &employees[i].salary);
        printf("Enter hours worked per day of employee %d: ", i+1);
        scanf("%f", &employees[i].hours_worked_per_day);
    }


    for (int i = 0; i < 10; i++) {
        if (employees[i].hours_worked_per_day >= 10 && employees[i].hours_worked_per_day <
12) {
            employees[i].salary += employees[i].salary * 0.05;
        } else if (employees[i].hours_worked_per_day >= 12 &&
employees[i].hours_worked_per_day < 15) {
            employees[i].salary += employees[i].salary * 0.1;
        } else if (employees[i].hours_worked_per_day >= 15) {
            employees[i].salary += employees[i].salary * 0.15;
```

```
        }
    }


    printf("\nEmployee details with updated salary:\n");
    for (int i = 0; i < 10; i++) {
        printf("Name: %s, Salary: $%.2f\n", employees[i].name, employees[i].salary);
    }

    return 0;
}
```

Question 7

```
#include <stdio.h>
#include <string.h>


struct Part {
  char serialNumber[4];
  int yearOfManufacture;
  char material[20];
  int quantityManufactured;
};

int main() {

  struct Part parts[] = {
    {"AA1", 2022, "Steel", 100},
    {"BB1", 2023, "Aluminum", 150},
    {"BB5", 2021, "Carbon Fiber", 75},
    {"CC6", 2022, "Titanium", 200},
    {"DD3", 2023, "Plastic", 50},
    {"EE7", 2021, "Aluminum", 125},
    {"FF9", 2022, "Steel", 300}
  };
  int numParts = sizeof(parts) / sizeof(struct Part);


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

    if (strcmp(parts[i].serialNumber, "BB1") >= 0 && strcmp(parts[i].serialNumber, "CC6") <= 0) {
      printf("Serial Number: %s\n", parts[i].serialNumber);
      printf("Year of Manufacture: %d\n", parts[i].yearOfManufacture);
      printf("Material: %s\n", parts[i].material);
```

```
      printf("Quantity Manufactured: %d\n\n", parts[i].quantityManufactured);
    }
  }

  return 0;
}
```

Question 8

```
#include <stdio.h>
#include <string.h>

struct Employee {
    int employee_id;
    char name[50];
    float salary;
};

struct Organization {
    char name[50];
    char number[50];
    struct Employee emp;
};

int main() {
    struct Organization org;


    strcpy(org.name, "NU-Fast");
    strcpy(org.number, "NUFAST123ABC");
    org.emp.employee_id = 127;
    strcpy(org.emp.name, "Linus Sebastian");
    org.emp.salary = 400000.0;


    printf("The size of structure organization: %ld\n", sizeof(org));


    printf("Organization Name: %s\n", org.name);
    printf("Organization Number: %s\n", org.number);


    printf("Employee id: %d\n", org.emp.employee_id);
    printf("Employee name: %s\n", org.emp.name);
```

```
    printf("Employee Salary: %.2f\n", org.emp.salary);

    return 0;
}
```

Question 9

```
#include <stdio.h>

struct Date {
    int day;
    int month;
    int year;
};

int main() {

    struct Date today;
    printf("Enter today's date (dd/mm/yyyy): ");
    scanf("%d/%d/%d", &today.day, &today.month, &today.year);


    struct Date future;
    future.day = today.day + 45;
    future.month = today.month;
    future.year = today.year;


    if (future.day > 31) {
        future.month++;
        future.day -= 31;
    }


    if (future.month > 12) {
        future.year++;
        future.month -= 12;
    }


    printf("45 days from %02d/%02d/%d is %02d/%02d/%d\n", today.day, today.month,
today.year, future.day, future.month, future.year);

    return 0;
```

```
}
```

Question 10

```
#include <stdio.h>

struct Box {
    int length;
    int width;
    int height;
};

int main() {
    int n;
    printf("Enter the number of boxes: ");
    scanf("%d", &n);

    struct Box boxes[n];


    for (int i = 0; i < n; i++) {
        printf("Enter the dimensions for box %d (length width height): ", i + 1);
        scanf("%d %d %d", &boxes[i].length, &boxes[i].width, &boxes[i].height);
    }


    for (int i = 0; i < n; i++) {
        if (boxes[i].height < 41) {
            int volume = boxes[i].length * boxes[i].width * boxes[i].height;
            printf("The volume of box %d is %d\n", i + 1, volume);
        } else {
            printf("Box %d cannot pass through the tunnel\n", i + 1);
        }
    }

    return 0;
}
```

BONUS QUESTION

```
#include <stdio.h>
#include <string.h>
```

```
struct Register {
    int course_id;
    char course_name[50];
};

struct Student {
    int student_id;
    char first_name[50];
    char last_name[50];
    char cell_no[20];
    char email[50];
    struct Register register_info;
};

int main() {
    struct Student std[5];


    for (int i = 0; i < 5; i++) {
        printf("Enter information for student %d\n", i + 1);
        printf("Student ID: ");
        scanf("%d", &std[i].student_id);
        printf("First Name: ");
        scanf("%s", std[i].first_name);
        printf("Last Name: ");
        scanf("%s", std[i].last_name);
        printf("Cell Number: ");
        scanf("%s", std[i].cell_no);
        printf("Email: ");
        scanf("%s", std[i].email);
        printf("Course ID: ");
        scanf("%d", &std[i].register_info.course_id);
        printf("Course Name: ");
        scanf("%s", std[i].register_info.course_name);
    }


    for (int i = 0; i < 5; i++) {
        printf("Information for student %d\n", i + 1);
        printf("Student ID: %d\n", std[i].student_id);
        printf("Name: %s %s\n", std[i].first_name, std[i].last_name);
        printf("Cell Number: %s\n", std[i].cell_no);
        printf("Email: %s\n", std[i].email);
        printf("Course ID: %d\n", std[i].register_info.course_id);
```

```
        printf("Course Name: %s\n", std[i].register_info.course_name);
    }

    return 0;
}
```