CPT111 PRINCIPLES OF PROGRAMMING

Pusat Pengajian Sains Komputer

Universiti Sains Malaysia

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Group Number: 44

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1.0) Problem Analysis

Develop a C++ program to help a small private hospital the hospital billing system for their patients. The program will compute the bills for many patients during their check out from the hospital using user-defined functions, arrays, and pointers. The program will be able to generate each category of charges and total charges for each patient and calculate the total charges for all patients. It will also generate the total charges for each category such as hospital stay, surgery, medication and service for all patients. The system will compute the average hospital stay for patients. Other than that, the program also be able to find the patient's name that pays the highest and lowest bill. total charges for each patient.

2.0) Specification requirement

2.1) Input:

1. The number of patients to be checked out from the hospital.
2. The name of each patient.
3. The choice of number option based on the Patient's Billing Menu.
4. The number of days that the patient has stayed in the hospital.
5. Types of room of a patient.
6. Sets of meals received by a patient for each day.
7. Types of surgery received by a patient.
8. Types of medication received by a patient.
9. Types of services received by a patient.
10. An input to check out the patient from the hospital.

2.2) Process:

1. The contents of inputFile are passed into different arrays according to the fileName to create 1-D parallel arrays. This is the part where the names and charges of rooms, meals, surgeries, medications, and services are filled into their own arrays to be processed.
2. *categoryCharge += cost[option-1] is used to fill in the different arrays with different elements of different charges of each category of hospital stays, surgery, medication and service.
3. To calculate the hospital stays charges (hospitalStayFee):
   i) Multiply the number of days that the patient has stayed in the hospital with the charges of the room type of the patient that has been chosen from the array.
   ii) According to the number of days, the patient's meals for each day are added to the multiplication result between number of days and the room charges.
4. To calculate the total hospital stays days, add up the number of days of all patients who have stayed in the hospital.

   durationSum += duration

5. To calculate the average hospital stays days, divide the total number of days of all patients who have stayed in the hospital by the number of patients.

   avgHospitalStayDays = durationSum / patientNum

6. To calculate the average hospital stays charges, divide the total hospital stays charges of all patients by the number of patients.

   avgHospitalStayCost = hospitalStayFee / patientNum

7. calCategory calculates the total charges for each category separately.
8. calEachPatientCharges calculates the total charges for each patient separately.
9. overallFee calculates the total charges for all patients.

   overallFee = hospitalStayFee + surgeryFee + medicationFee + serviceFee

10. findHighest determines the subscript of patient with highest bills, the subscript is then used to process the patientName array to find the patient's name.
11. findLowest determines the subscript of patient with lowest bills, the subscript is then used to process the patientName array to find the patient's name.

2.3) Output:

1. Hospital stays charges for each patient.
2. Surgery charges for each patient.
3. Medication charges for each patient.
4. Service charges for each patient.
5. Total charges for each patient.
6. Total charges for all patients.
7. Total service charges.
8. Total medication charges.
9. Total surgery charges.
10. Total hospital stays charges.
11. The name of the patient with highest bills.
12. The name of the patient with lowest bills.
13. Average hospital stays charges for a patient.
14. Average hospital stays days for a patient.

2.4) Constraints and Assumptions:

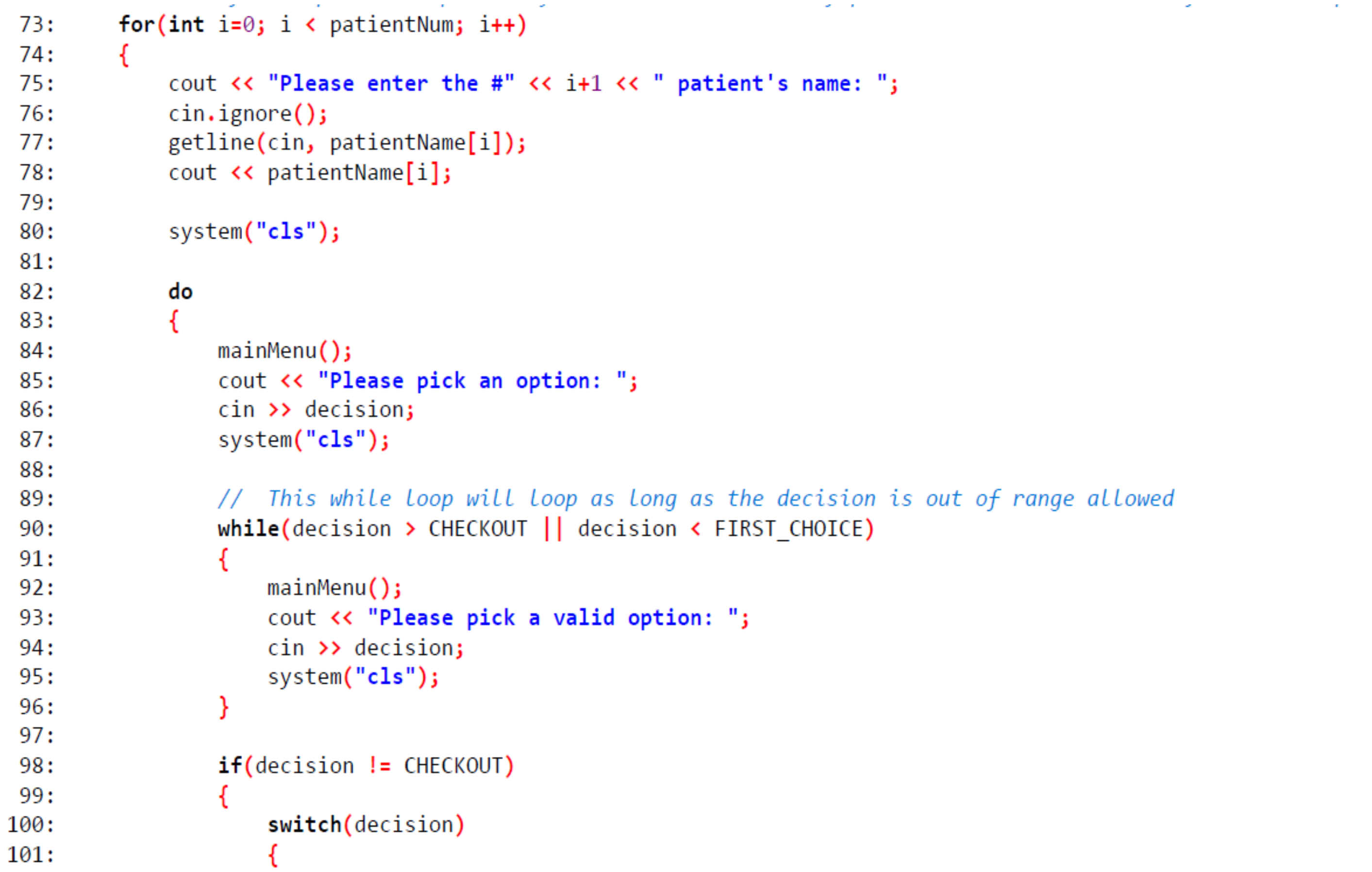
1. This program will only run for as many times as the number of patients to be checked out from the hospital.
2. When making choices from menus, the numbers chosen cannot be out of the available range or the program will prompt user to enter an option again.
3. The hospital stays option can only be chosen once for each patient.
4. The types of surgeries, rooms, meals, medications, and services and also the charges are stored in arrays as elements, so for loop has to be used to step through the arrays to obtain the values.

3.0) Variable Definitions

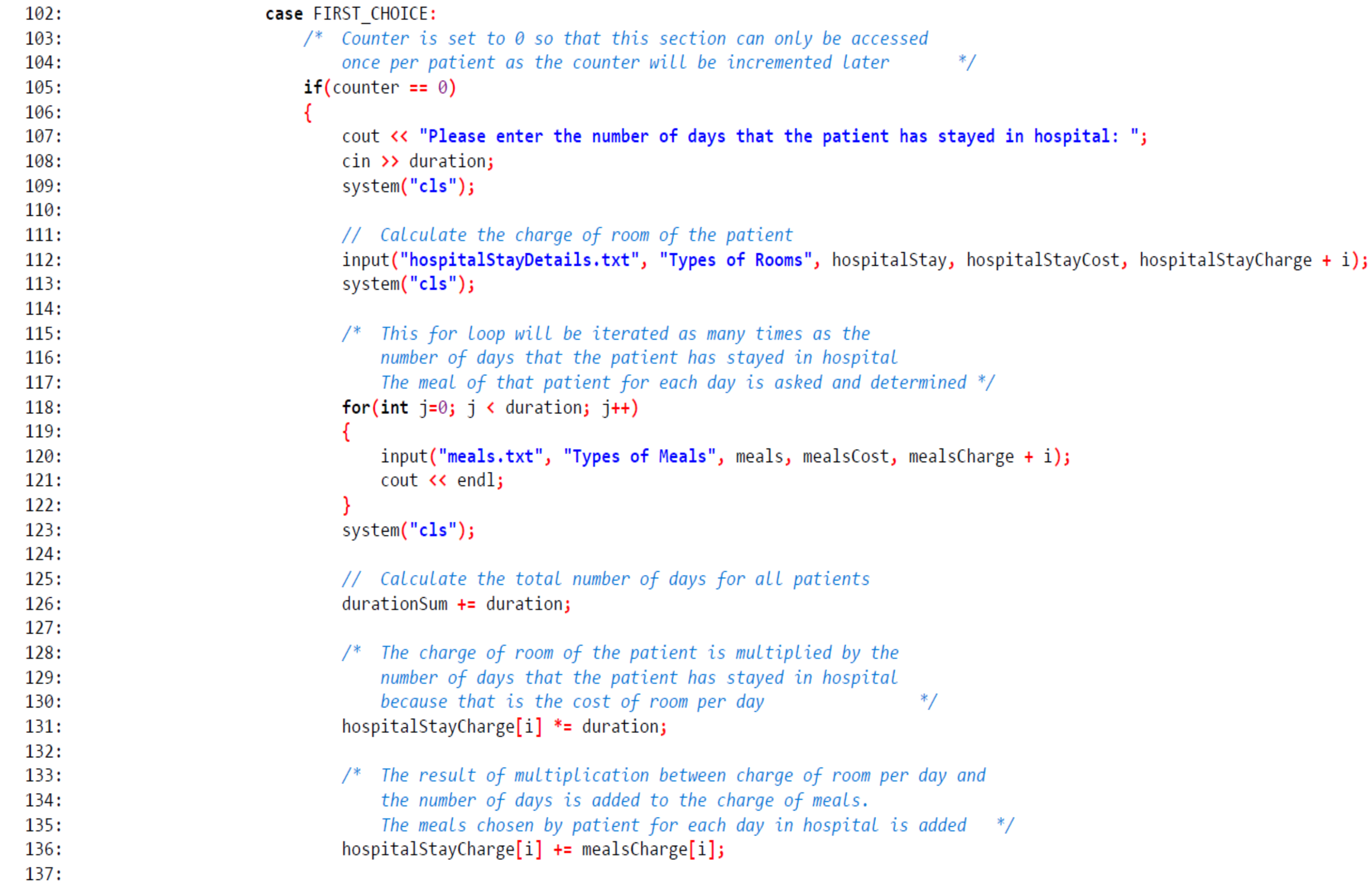
Variables	Definitions
FIRST_CHOICE	A constant global variable which holds the integer 1
SECOND_CHOICE	A constant global variable which holds the integer 2
THIRD_CHOICE	A constant global variable which holds the integer 3
FOURTH_CHOICE	A constant global variable which holds the integer 4
decision	Represents the choice made based on the main menu
patientNum	The number of patients to be checked out from the hospital
highest	A variable that holds the array subscript of the patient with highest bills
lowest	A variable that Holds the array subscript of the patient with lowest bills
counter	A counter that holds zero value and can be incremented
hospitalStayFee	Sum of all the hospital stays charges of all the patients
surgeryFee	Sum of all the surgery charges of all the patients
medicationFee	Sum of all the medication charges of all the patients
serviceFee	Sum of all the service charges of all the patients
overallFee	Sum of all hospital stays charges, surgery charges, medication charges, and service charges of all the patients
duration	The number of days that the patient stays in the hospital
durationSum	The sum of all the days that all the patients have stayed in the hospital
avgHospitalStayCost	The average hospital stays charges of a patient
avgHospitalStayDays	The average hospital stays days of a patient
CHECKOUT	A local constant variable that holds the value 5, for user to check out
line	A variable that is used to hold the input from a text file temporarily
size	A variable to determine the total number of lines of contents from a file
option	A variable that holds the choice of integer of the user based on different menu
sum	The total of each category of charges
max	Holds the highest total charges for a patient among all the patients
min	Holds the lowest total charges for a patient among all the patients
maxSubscript	Holds the subscript of a patient with highest bills
minSubscript	Holds the subscript of a patient with the lowest bills

4.0) Source Code

```
/*
*This program has been developed to help a small private hospital and oversee the hospital billing system for their patients. It
allows the system to process the bills for many patients during their check out from the hospital.
*Developers: Yeo Ying Sheng, Edu Sinusi, Challven Japirin
*Contact: yeousm@student.usm.my, sinusiedu@student.usm.my, challven001@student.usm.my
*/

#include <iostream>
#include <fstream>
#include <string>
#include <iomanip>

using namespace std;


const int   FIRST_CHOICE = 1,
            SECOND_CHOICE = 2,
            THIRD_CHOICE = 3,
            FOURTH_CHOICE = 4;

void mainMenu();
void input(string, string, string[], double[], double *);
double calCategory(double[], int);
double calEachPatientCharges(double[], double[], double[], double[], int);
int findHighest(double[], int);
int findLowest(double[], int);

int main()
{
    int decision, patientNum, lowest, highest, counter=0;
    double  hospitalStayFee, surgeryFee, medicationFee, serviceFee, overallFee,
            duration, durationSum = 0, avgHospitalStayCost, avgHospitalStayDays;
    const int CHECKOUT = 5;

    //  Initialize the 1-D parallel arrays for hospital stays, surgery, medication and service
    //  The different name/types and charges of each category are stored as elements in the arrays
    string hospitalStay[50];
    double hospitalStayCost[50];
    string meals[50];
    double mealsCost[50];
    string surgery[50];
    double surgeryCost[50];
    string medication[50];
    double medicationCost[50];
    string service[50];
    double serviceCost[50];

    //  To determine the number of patients to be checked out
    cout << "Please enter the number of patients: ";
    cin >> patientNum;


    string patientName[patientNum];

    /*  The following arrays are dynamically allocated so that
        the addresses of these arrays can be passed as arguments
        to another function to manipulate each element in the arrays */

    /*  The arrays are used to store the charges of each category,
        as an example, in surgeryCharge[patientNum],
        the first element with subscript 0 is the surgery
        charges of the first patient                            */
    double *hospitalStayCharge = new double[patientNum];
    double *mealsCharge = new double[patientNum];
    double *surgeryCharge = new double[patientNum];
    double *medicationCharge = new double[patientNum];
    double *serviceCharge = new double[patientNum];
    double patientCharge[patientNum];

    system("cls");

    //  This for loop will loop as many times as the number of patients to be checked out from the hospital
```



```
for(int i=0; i < patientNum; i++)
{
    cout << "Please enter the #" << i+1 << " patient's name: ";
    cin.ignore();
    getline(cin, patientName[i]);
    cout << patientName[i];

    system("cls");

    do
    {
        mainMenu();
        cout << "Please pick an option: ";
        cin >> decision;
        system("cls");

        //  This while loop will loop as long as the decision is out of range allowed
        while(decision > CHECKOUT || decision < FIRST_CHOICE)
        {
            mainMenu();
            cout << "Please pick a valid option: ";
            cin >> decision;
            system("cls");
        }

        if(decision != CHECKOUT)
        {
            switch(decision)
            {
```



```
                case FIRST_CHOICE:
                    /*  Counter is set to 0 so that this section can only be accessed
                        once per patient as the counter will be incremented later       */
                    if(counter == 0)
                    {
                        cout << "Please enter the number of days that the patient has stayed in hospital: ";
                        cin >> duration;
                        system("cls");

                        //  Calculate the charge of room of the patient
                        input("hospitalStayDetails.txt", "Types of Rooms", hospitalStay, hospitalStayCost, hospitalStayCharge + i);
                        system("cls");

                        /*  This for loop will be iterated as many times as the
                            number of days that the patient has stayed in hospital
                            The meal of that patient for each day is asked and determined */
                        for(int j=0; j < duration; j++)
                        {
                            input("meals.txt", "Types of Meals", meals, mealsCost, mealsCharge + i);
                            cout << endl;
                        }
                        system("cls");

                        //  Calculate the total number of days for all patients
                        durationSum += duration;

                        /*  The charge of room of the patient is multiplied by the
                            number of days that the patient has stayed in hospital
                            because that is the cost of room per day                */
                        hospitalStayCharge[i] *= duration;

                        /*  The result of multiplication between charge of room per day and
                            the number of days is added to the charge of meals.
                            The meals chosen by patient for each day in hospital is added   */
                        hospitalStayCharge[i] += mealsCharge[i];

```

```
                            counter++;
                        }
                        else
                        {
                            cout << "This option can only be chosen once for each patient." << endl;
                        }
                        break;
                    case SECOND_CHOICE:
                        //  Calculate the surgery charges of each patient
                        input("surgery.txt", "Types of Surgery", surgery, surgeryCost, surgeryCharge + i);
                        system("cls");
                        break;
                    case THIRD_CHOICE:
                        //  Calculate the medication charges of each patient
                        input("medication.txt", "Types of Medication", medication, medicationCost, medicationCharge + i);
                        system("cls");
                        break;
                    case FOURTH_CHOICE:
                        //  Calculate the service charges of each patient
                        input("service.txt", "Types of Service", service, serviceCost, serviceCharge + i);
                        system("cls");
                        break;
                    default:
                        break;
                }
            }
        }while(decision != CHECKOUT);
        //  Counter is set to zero after the information process of each patient is completed
        counter = 0;
    }

    /*  These functions are called to calculate the sum of each category of
        hospital stay, surgery, medication and service separately               */
    hospitalStayFee = calCategory(hospitalStayCharge, patientNum);
    surgeryFee = calCategory(surgeryCharge, patientNum);
    medicationFee = calCategory(medicationCharge, patientNum);
    serviceFee = calCategory(serviceCharge, patientNum);

    //  Calculate the average cost and duration of hospital stays for one patient
    avgHospitalStayCost = hospitalStayFee / patientNum;
    avgHospitalStayDays = durationSum / patientNum;

    //  Calculates the total sum of charges of hospital stay, surgery, medication and service
    overallFee = hospitalStayFee + surgeryFee + medicationFee + serviceFee;

    //  Calls the function calEachPatientCharges to calculate the total charges of each patient separately
    //  When i is equal to 0, the total charge for the first patient with subscript 0 in the array is calculated
    //  When i is equal to 1, the total charge for the second patient with subscript 1 in the array is calculated and etc
    for(int i=0; i < patientNum; i++)
    {
        patientCharge[i] = calEachPatientCharges(hospitalStayCharge, surgeryCharge, medicationCharge, serviceCharge, i);
    }

    /*  Call the findHighest and findLowest functions to return the array
        subscript of the patient with highest bill and lowest bill          */
    highest = findHighest(patientCharge, patientNum);
    lowest = findLowest(patientCharge, patientNum);

    //  This section displays the summary of payment of each patient
    //  This part displays all the necessary information of each patient
    cout << "Summary of Payment for Each Patient" << endl;
    cout << "--------------------------------------------------------" << endl;
    for(int i=0; i < patientNum; i++)
    {
        cout << fixed << setprecision(2);
```

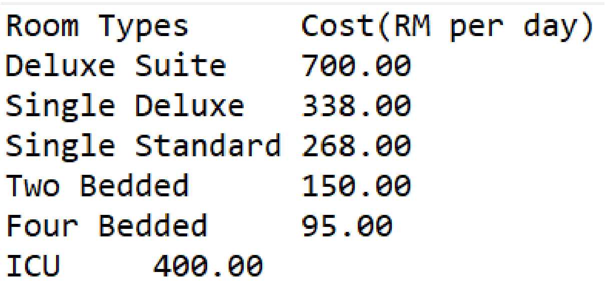
```cpp
        cout << "Payment of " << patientName[i] << ":" << endl;
        cout << "Hospital stays charges: RM" << hospitalStayCharge[i] << endl;
        cout << "Surgery charges: RM" << surgeryCharge[i] << endl;
        cout << "Medication charges: RM" << medicationCharge[i] << endl;
        cout << "Service charges: RM" << serviceCharge[i] << endl;
        cout << "Total charges for this patient: RM" << patientCharge[i] << endl;
        cout << "--------------------------------------------------------" << endl;
    }
    cout << endl;

    //  This section displays the summary of payment for each category
    cout << "Summary of Payment for Each Category" << endl;
    cout << "--------------------------------------------------------" << endl;
    cout << "Hospital stays charges: RM" << hospitalStayFee << endl;
    cout << "Surgery charges: RM" << surgeryFee << endl;
    cout << "Medication charges: RM" << medicationFee << endl;
    cout << "Service charges: RM" << serviceFee << endl;
    cout << "--------------------------------------------------------" << endl;
    cout << endl;

    //  This section displays the summary of overall payment
    cout << "Summary of Overall Payment" << endl;
    cout << "--------------------------------------------------------" << endl;

    //  Displays the name of patients with the highest bill and the lowest bill
    cout << "Patient with the highest bill: " << patientName[highest] << endl;
    cout << "Patient with the lowest bill: " << patientName[lowest] << endl;
    cout << "Average hospital stay charges for a patient: RM" << avgHospitalStayCost << endl;
    cout << "Average hospital stay days for a patient: " << avgHospitalStayDays << endl;
    cout << "Total charges for all patients: RM" << overallFee << endl;
    cout << "--------------------------------------------------------" << endl;

    // Free dynamically allocated memory
    delete [] hospitalStayCharge;
    hospitalStayCharge = nullptr;
    delete [] mealsCharge;
    mealsCharge = nullptr;
    delete [] surgeryCharge;
    surgeryCharge = nullptr;
    delete [] medicationCharge;
    medicationCharge = nullptr;
    delete [] serviceCharge;
    serviceCharge = nullptr;

    return 0;
}



//  This function displays the main menu
void mainMenu()
{
    cout << "Patient Billing Menu\n"
         << "--------------------------------\n"
         << "1. Hospital Stays\n"
         << "2. Types of Surgery\n"
         << "3. Types of Medication\n"
         << "4. Types of Service\n"
         << "5. Check out\n"
         << "--------------------------------\n";
}



/*  This function inputs the contents of different categories and cost of each
    content from the inputFile into the arrays to produce 1-D parallel arrays   */

/*  This function also calculates the charge of each category of
    hospital stay, surgery, medication, and service according
    to the arguments passed into its parameters                              */
void input(string fileName, string titleName, string array[], double cost[], double *categoryCharge)
{
```

```
fstream inputFile;
inputFile.open(fileName, ios::in);

string line;
int size = 0, option;

getline(inputFile, line, '\n');

/*  Inputs from inputFile until the end of file to determine
    the number of lines of contents in the file excluding the titles */
while(!inputFile.eof())
{
    getline(inputFile, line, '\n');
    size++;
}

inputFile.seekg(0, ios::beg);
getline(inputFile, line, '\n');

//  The contents of inputFile are being input into the arrays of array and cost
for(int i=0; i < size; i++)
{
    getline(inputFile, array[i], '\t');
    inputFile >> cost[i];
    getline(inputFile, line, '\n');
}

/*  This section displays the menu of different categories like the
    types of rooms chosen by patient, types of meals, types of surgeries, types of medications,
    and types of services according to what arguments are passed into the parameters                */
cout << titleName << endl;
cout << "-----------------------------" << endl;

int i=0;
for(; i < size; i++)
{
    cout << i+1 << ". " << array[i] << endl;
}
cout << i+1 << ". " << "Check Out" << endl;
cout << "-----------------------------" << endl;
cout << "Please pick an option (" << FIRST_CHOICE << " - " << size+1 << "): ";
cin >> option;

//  This section will execute as long as the option is out of range
while(option < FIRST_CHOICE || option > size+1)
{
    system("cls");
    cout << titleName << endl;
    cout << "-----------------------------" << endl;
    int i=0;
    for(; i < size; i++)
    {
        cout << i+1 << ". " << array[i] << endl;
    }
    cout << i+1 << ". " << "Check Out" << endl;
    cout << "-----------------------------" << endl;
    cout << "Please pick an option (" << FIRST_CHOICE << " - " << size+1 << "): ";
    cin >> option;
}

/*  Put the charges of each category of hospital stay,
    surgery, medication, and service into different arrays */

//  This is the part where the arrays are being filled with elements to be processed later
*categoryCharge += cost[option-1];
```

```


    inputFile.close();
}



/*  This function calculates and returns the total charges of each
    category of hospital stay, surgery, medication and service separately */
double calCategory(double categoryCharge[], int patientNum)
{
    double sum = 0;
    for(int i=0; i < patientNum; i++)
    {
        sum += categoryCharge[i];
    }
    return sum;
}



/*  Calculates and returns the sum of hospital stay charges, surgery charges,
    medication charges and service charges for each patient separately          */
//  If num = 0, the total bills of the first patient with subscript 0 in the array is returned
//  If num = 1, the total bills of the second patient with subscript 1 in the array is returned and etc
double calEachPatientCharges(double hospitalStayCharge[], double surgeryCharge[], double medicationCharge[], double serviceCharge[], int num)
{
    return hospitalStayCharge[num] + surgeryCharge[num] + medicationCharge[num] + serviceCharge[num];
}



//  Returns the array subscript of the highest bill to be paid to the hospital
int findHighest(double patientCharge[], int patientNum)
{
    int max = patientCharge[0], maxSubscript = 0;
    for(int i=0; i < patientNum; i++)
    {
        if(max < patientCharge[i])
        {
            max = patientCharge[i];
            maxSubscript = i;
        }
    }
    return maxSubscript;
}



//  Returns the array subscript of the lowest bill to be paid to the hospital
int findLowest(double patientCharge[], int patientNum)
{
    int min = patientCharge[0], minSubscript = 0;
    for(int i=0; i < patientNum; i++)
    {
        if(min > patientCharge[i])
        {
            min = patientCharge[i];
            minSubscript = i;
        }
    }
    return minSubscript;
}
```

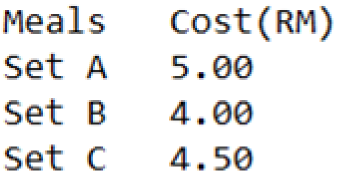
5.0) Text Files

1. hospitalStayDetails.txt



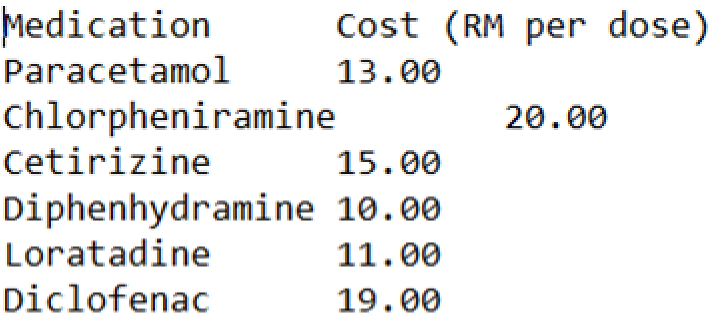
```
Room Types      Cost(RM per day)
Deluxe Suite    700.00
Single Deluxe   338.00
Single Standard 268.00
Two Bedded      150.00
Four Bedded     95.00
ICU     400.00
```

2. meals.txt



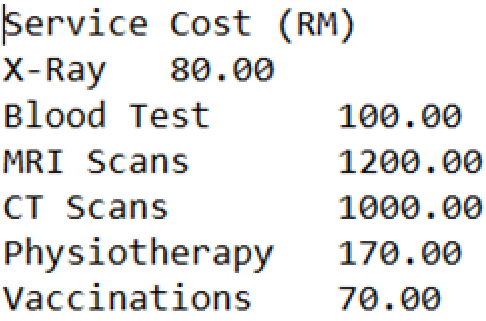
```
Meals   Cost(RM)
Set A   5.00
Set B   4.00
Set C   4.50
```

3. medication.txt



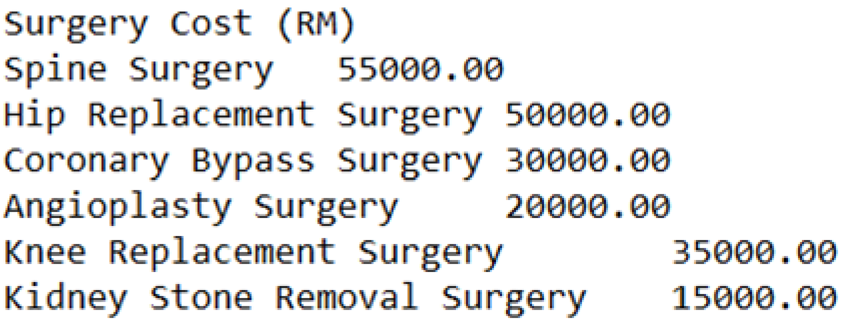
```
Medication      Cost (RM per dose)
Paracetamol     13.00
Chlorpheniramine        20.00
Cetirizine      15.00
Diphenhydramine 10.00
Loratadine      11.00
Diclofenac      19.00
```

4. service.txt



```
Service Cost (RM)
X-Ray   80.00
Blood Test      100.00
MRI Scans       1200.00
CT Scans        1000.00
Physiotherapy   170.00
Vaccinations    70.00
```

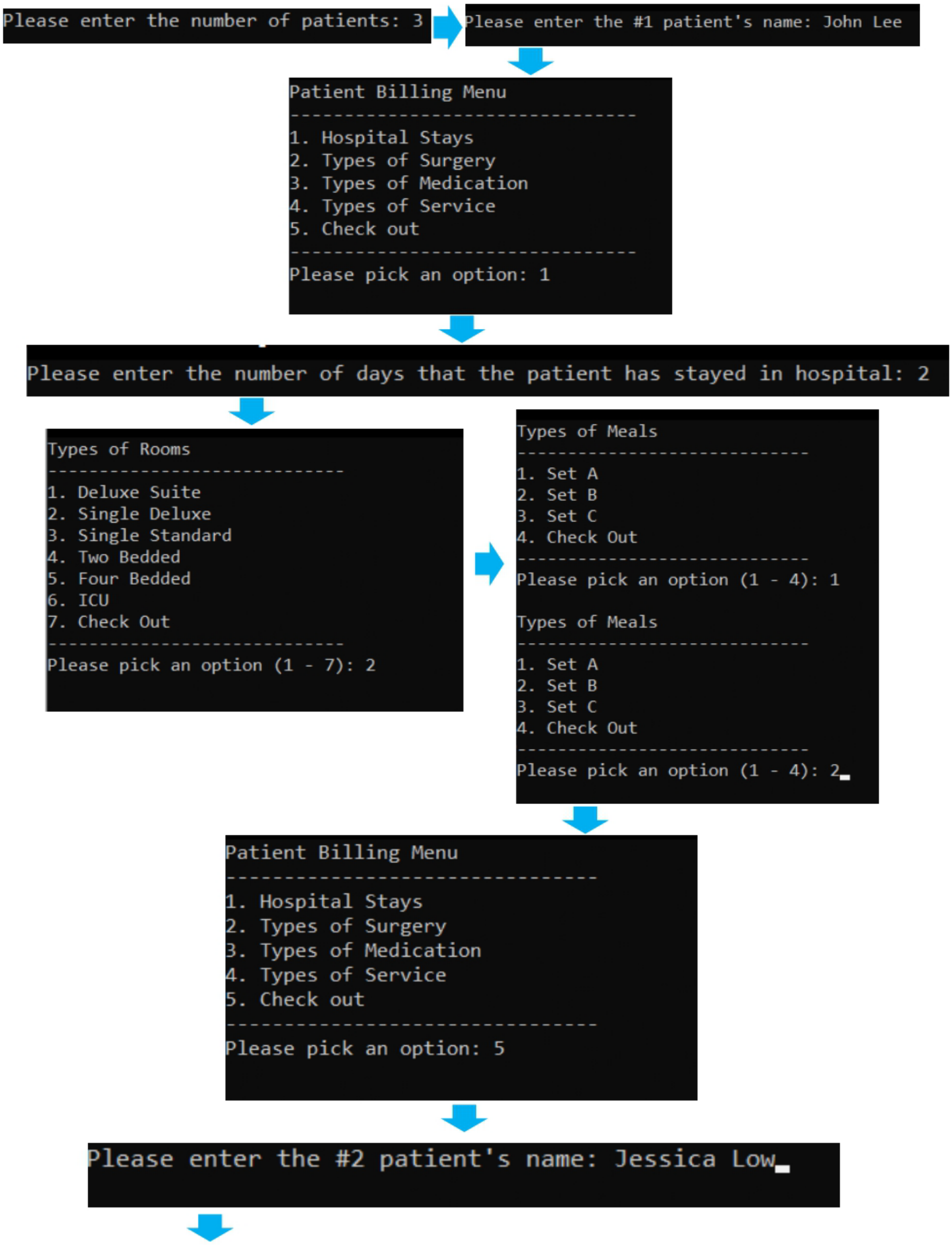
5. surgery.txt



```
Surgery Cost (RM)
Spine Surgery   55000.00
Hip Replacement Surgery 50000.00
Coronary Bypass Surgery 30000.00
Angioplasty Surgery     20000.00
Knee Replacement Surgery        35000.00
Kidney Stone Removal Surgery    15000.00
```

6.0) Sample Output

Sample Output #1



```
Please enter the number of patients: 3
```

```
Please enter the #1 patient's name: John Lee
```

```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 1
```

```
Please enter the number of days that the patient has stayed in hospital: 2
```

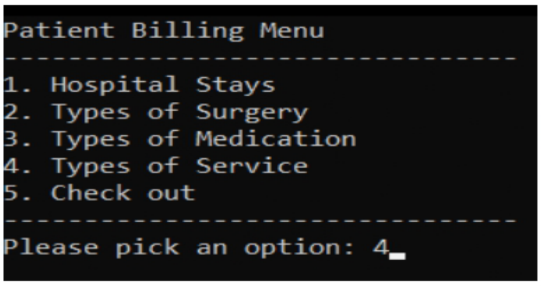
```
Types of Rooms
-----------------------------
1. Deluxe Suite
2. Single Deluxe
3. Single Standard
4. Two Bedded
5. Four Bedded
6. ICU
7. Check Out
-----------------------------
Please pick an option (1 - 7): 2
```

```
Types of Meals
----------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
----------------------------
Please pick an option (1 - 4): 1

Types of Meals
----------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
----------------------------
Please pick an option (1 - 4): 2
```

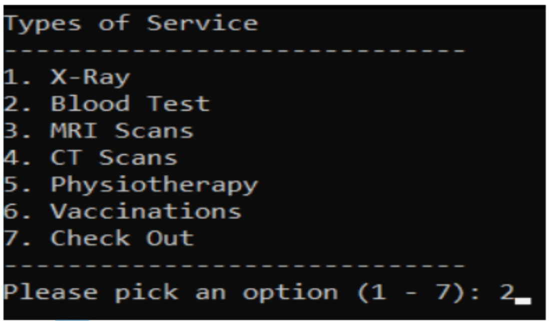
```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 5
```

```
Please enter the #2 patient's name: Jessica Low
```

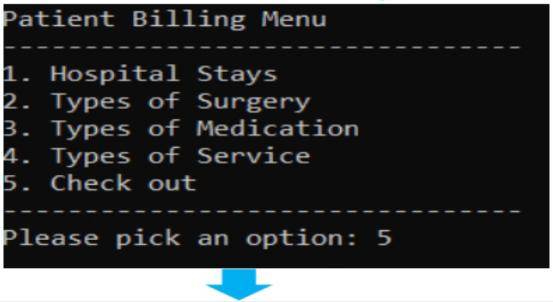
Continuation of sample Output #1



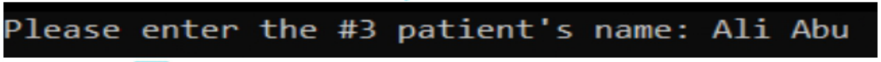
```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 4_
```



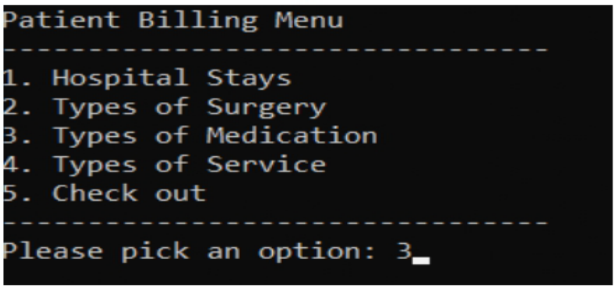
```
Types of Service
----------------------------
1. X-Ray
2. Blood Test
3. MRI Scans
4. CT Scans
5. Physiotherapy
6. Vaccinations
7. Check Out
----------------------------
Please pick an option (1 - 7): 2_
```



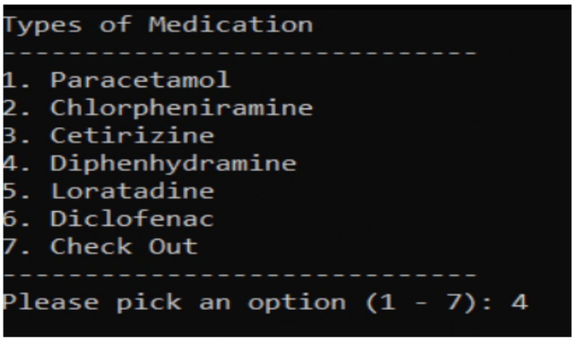
```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 5
```



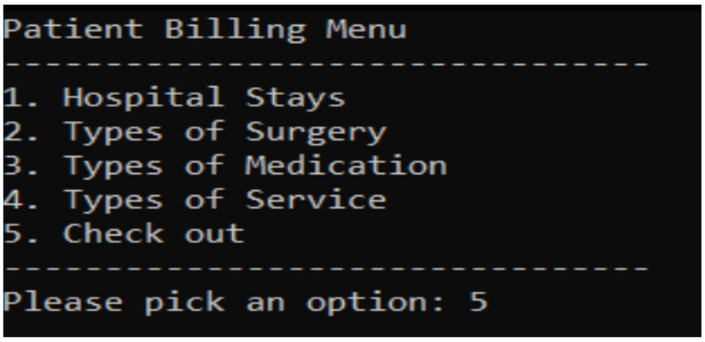
```
Please enter the #3 patient's name: Ali Abu
```



```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 3_
```

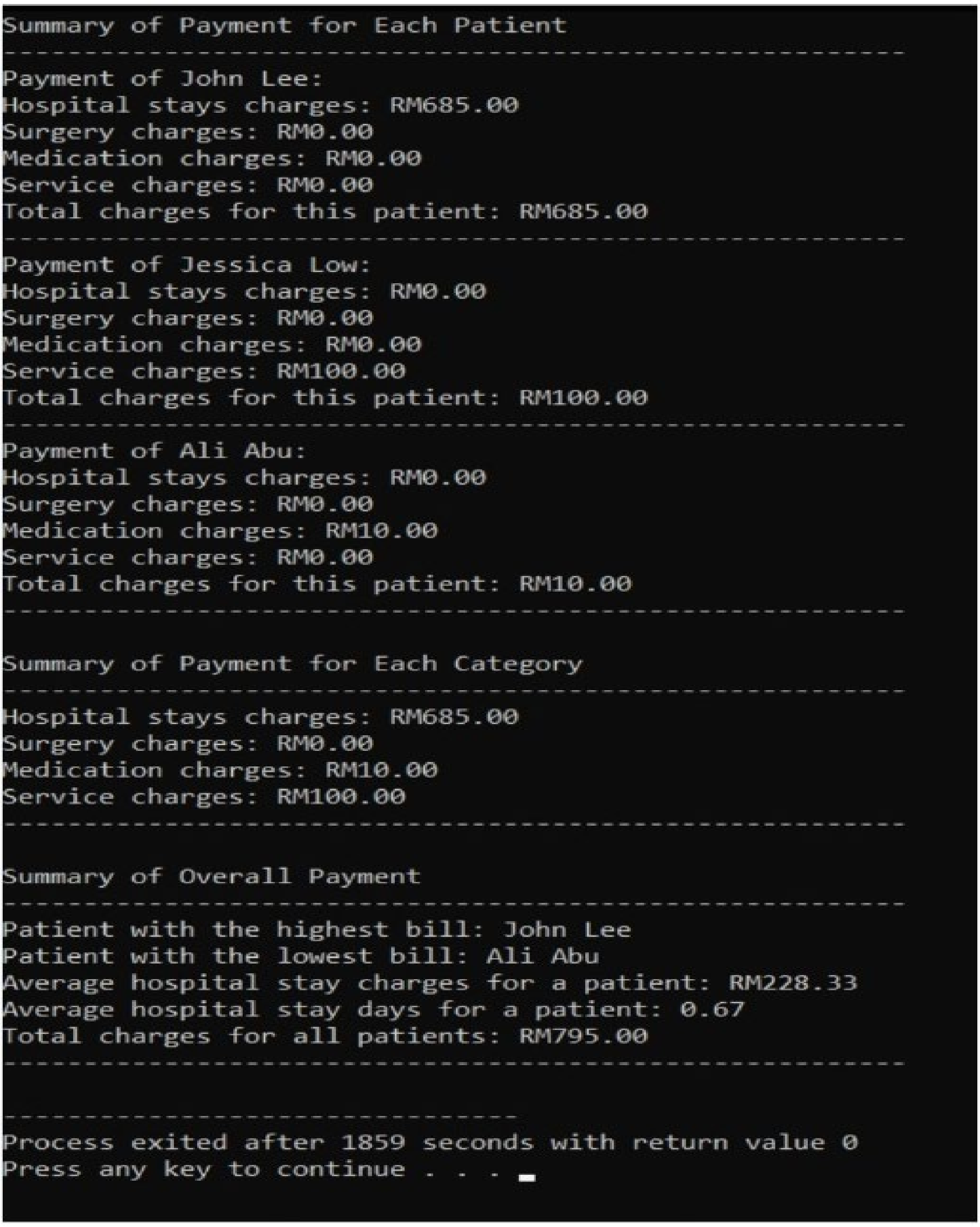


```
Types of Medication
----------------------------
1. Paracetamol
2. Chlorpheniramine
3. Cetirizine
4. Diphenhydramine
5. Loratadine
6. Diclofenac
7. Check Out
----------------------------
Please pick an option (1 - 7): 4
```



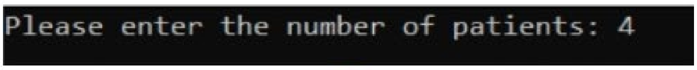
```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 5
```

Summary of Sample Output #1

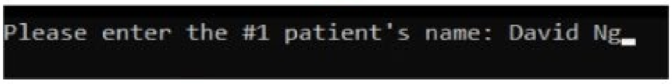


```
Summary of Payment for Each Patient
-------------------------------------------------------
Payment of John Lee:
Hospital stays charges: RM685.00
Surgery charges: RM0.00
Medication charges: RM0.00
Service charges: RM0.00
Total charges for this patient: RM685.00
-------------------------------------------------------
Payment of Jessica Low:
Hospital stays charges: RM0.00
Surgery charges: RM0.00
Medication charges: RM0.00
Service charges: RM100.00
Total charges for this patient: RM100.00
-------------------------------------------------------
Payment of Ali Abu:
Hospital stays charges: RM0.00
Surgery charges: RM0.00
Medication charges: RM10.00
Service charges: RM0.00
Total charges for this patient: RM10.00
-------------------------------------------------------

Summary of Payment for Each Category
-------------------------------------------------------
Hospital stays charges: RM685.00
Surgery charges: RM0.00
Medication charges: RM10.00
Service charges: RM100.00
-------------------------------------------------------

Summary of Overall Payment
-------------------------------------------------------
Patient with the highest bill: John Lee
Patient with the lowest bill: Ali Abu
Average hospital stay charges for a patient: RM228.33
Average hospital stay days for a patient: 0.67
Total charges for all patients: RM795.00
-------------------------------------------------------


--------------------------------
Process exited after 1859 seconds with return value 0
Press any key to continue . . .
```

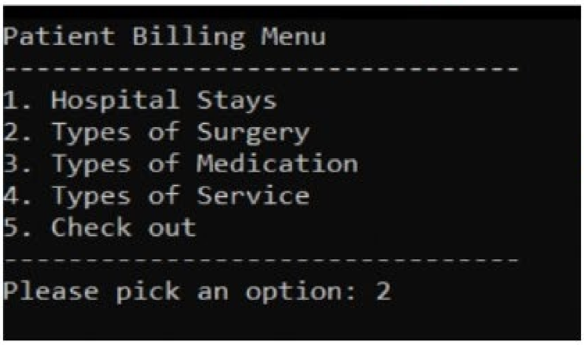
Sample Output #2



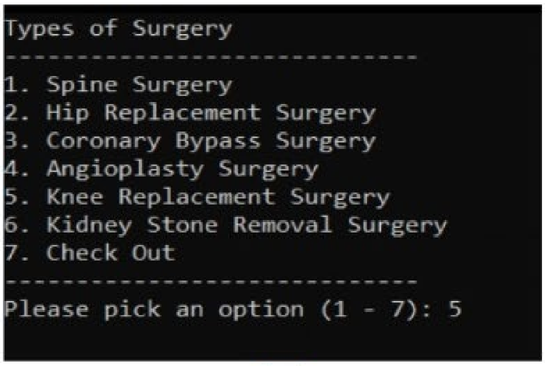
```
Please enter the number of patients: 4
```



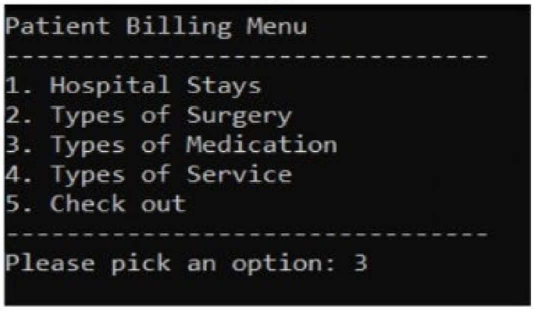
```
Please enter the #1 patient's name: David Ng
```



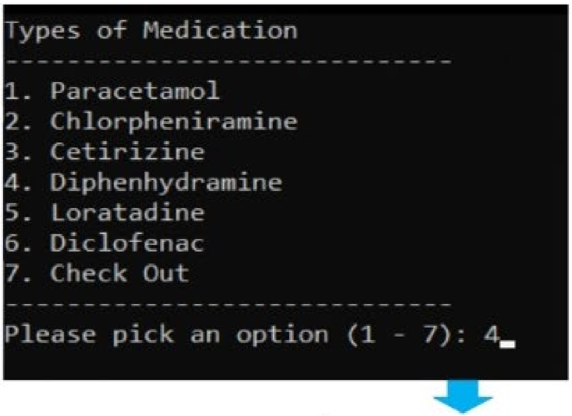
```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 2
```



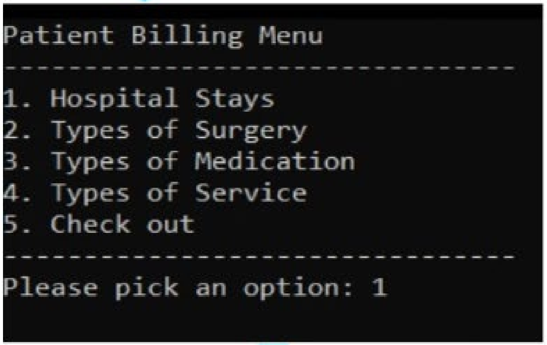
```
Types of Surgery
----------------------------
1. Spine Surgery
2. Hip Replacement Surgery
3. Coronary Bypass Surgery
4. Angioplasty Surgery
5. Knee Replacement Surgery
6. Kidney Stone Removal Surgery
7. Check Out
----------------------------
Please pick an option (1 - 7): 5
```



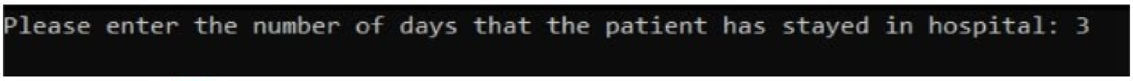
```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 3
```



```
Types of Medication
----------------------------
1. Paracetamol
2. Chlorpheniramine
3. Cetirizine
4. Diphenhydramine
5. Loratadine
6. Diclofenac
7. Check Out
----------------------------
Please pick an option (1 - 7): 4
```

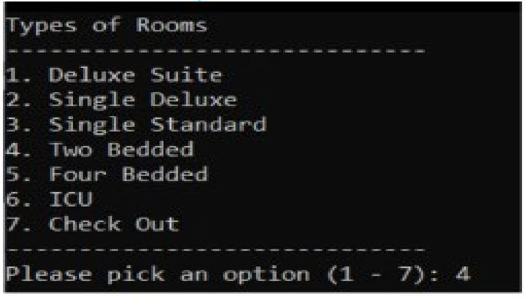


```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 1
```

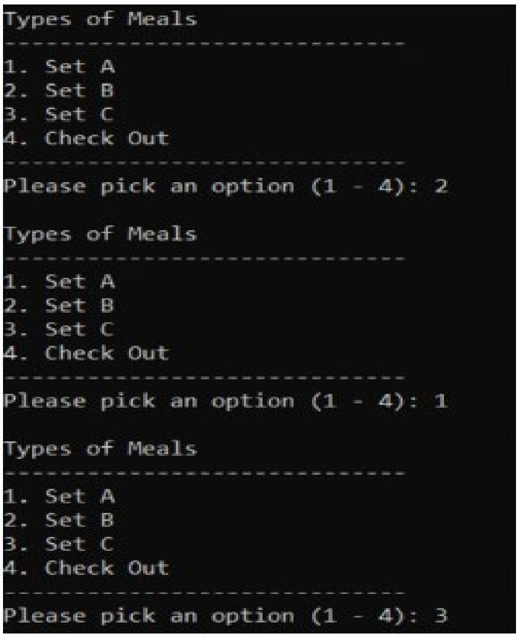


```
Please enter the number of days that the patient has stayed in hospital: 3
```

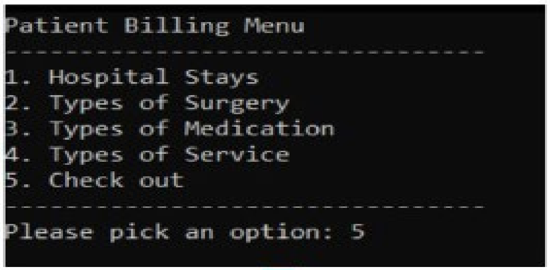
Continuation of sample Output #2



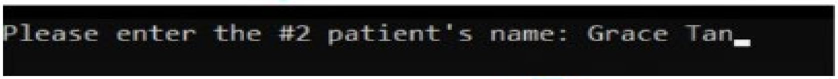
```
Types of Rooms
------------------------------
1. Deluxe Suite
2. Single Deluxe
3. Single Standard
4. Two Bedded
5. Four Bedded
6. ICU
7. Check Out
------------------------------
Please pick an option (1 - 7): 4
```



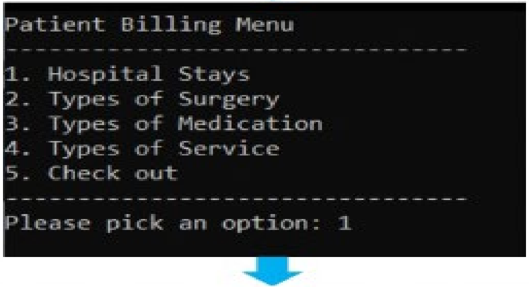
```
Types of Meals
------------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
------------------------------
Please pick an option (1 - 4): 2

Types of Meals
------------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
------------------------------
Please pick an option (1 - 4): 1

Types of Meals
------------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
------------------------------
Please pick an option (1 - 4): 3
```



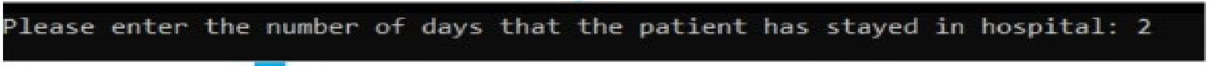
```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 5
```



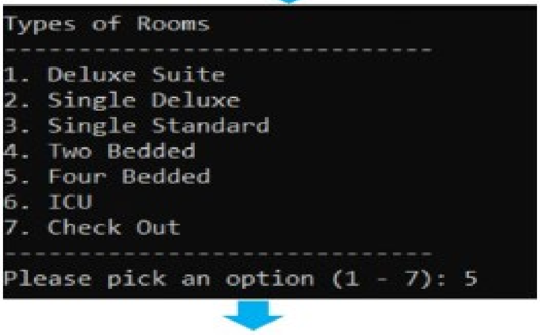
```
Please enter the #2 patient's name: Grace Tan_
```



```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 1
```

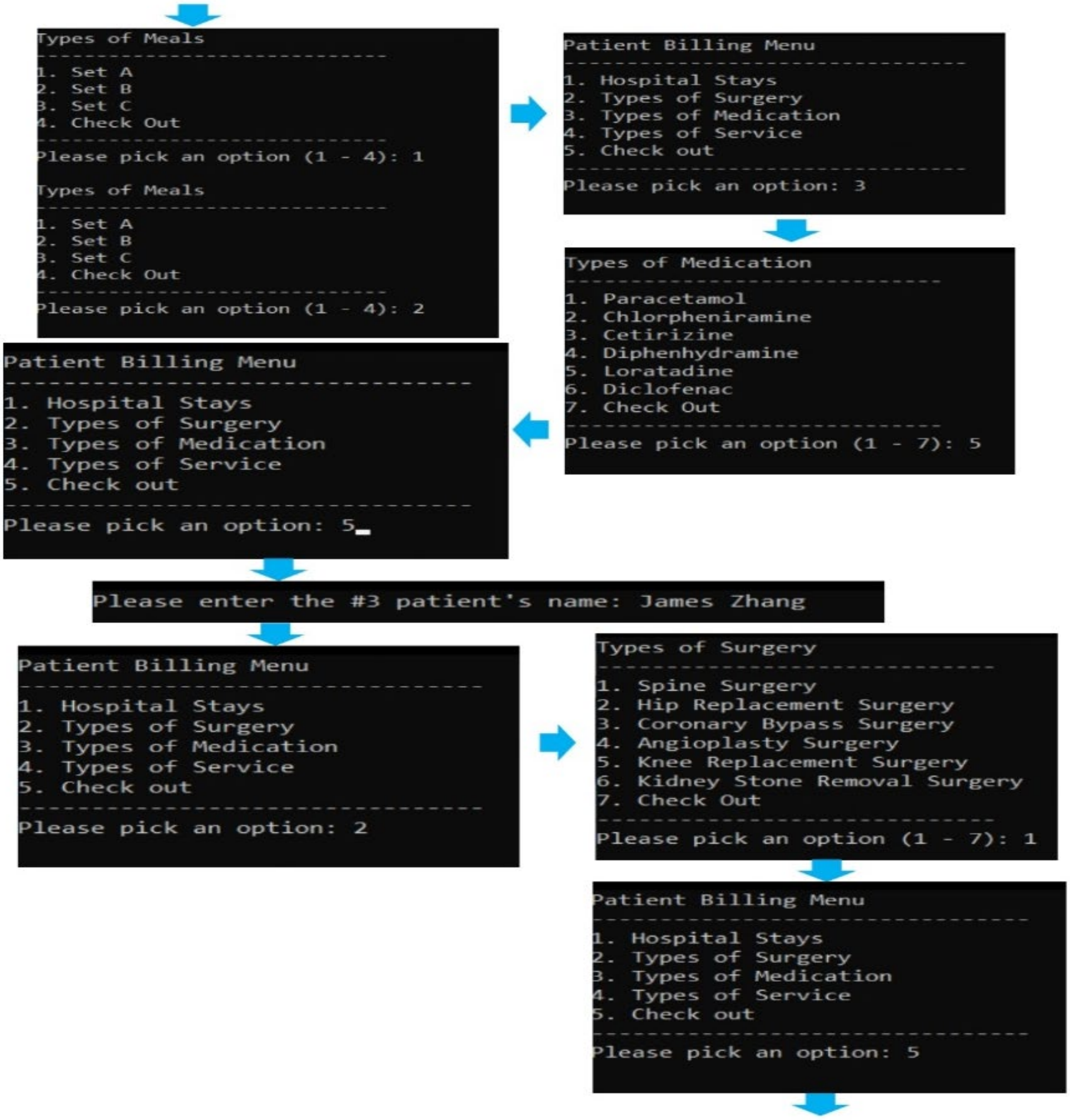


```
Please enter the number of days that the patient has stayed in hospital: 2
```



```
Types of Rooms
------------------------------
1. Deluxe Suite
2. Single Deluxe
3. Single Standard
4. Two Bedded
5. Four Bedded
6. ICU
7. Check Out
------------------------------
Please pick an option (1 - 7): 5
```

Continuation of sample Output #2



```
Types of Meals
------------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
------------------------------
Please pick an option (1 - 4): 1
Types of Meals
------------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
------------------------------
Please pick an option (1 - 4): 2
```

```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 3
```

```
Types of Medication
------------------------------
1. Paracetamol
2. Chlorpheniramine
3. Cetirizine
4. Diphenhydramine
5. Loratadine
6. Diclofenac
7. Check Out
------------------------------
Please pick an option (1 - 7): 5
```

```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 5
```

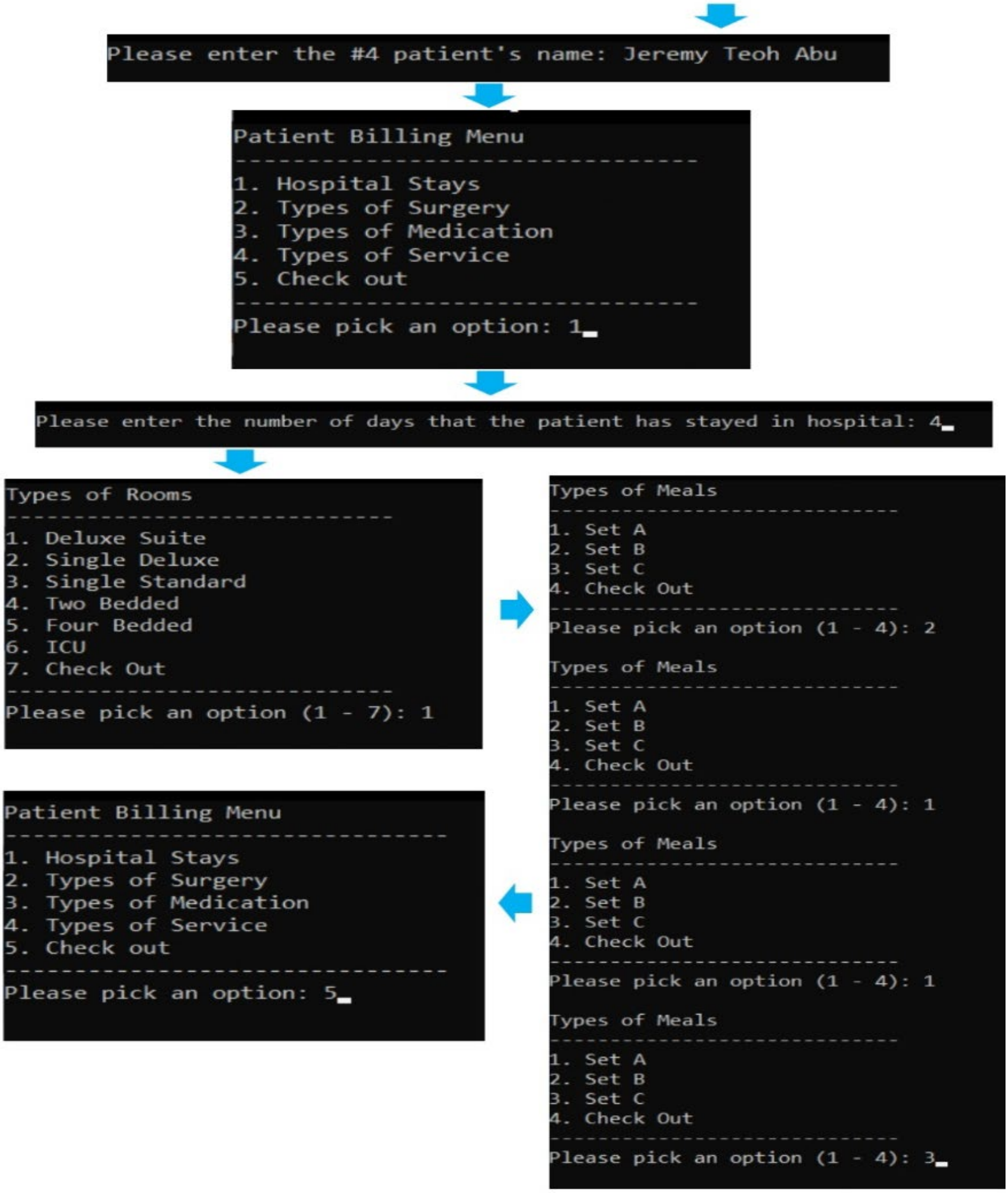
```
Please enter the #3 patient's name: James Zhang
```

```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 2
```

```
Types of Surgery
------------------------------
1. Spine Surgery
2. Hip Replacement Surgery
3. Coronary Bypass Surgery
4. Angioplasty Surgery
5. Knee Replacement Surgery
6. Kidney Stone Removal Surgery
7. Check Out
------------------------------
Please pick an option (1 - 7): 1
```

```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 5
```

Continuation of sample Output #2



```
Please enter the #4 patient's name: Jeremy Teoh Abu
```

```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 1
```

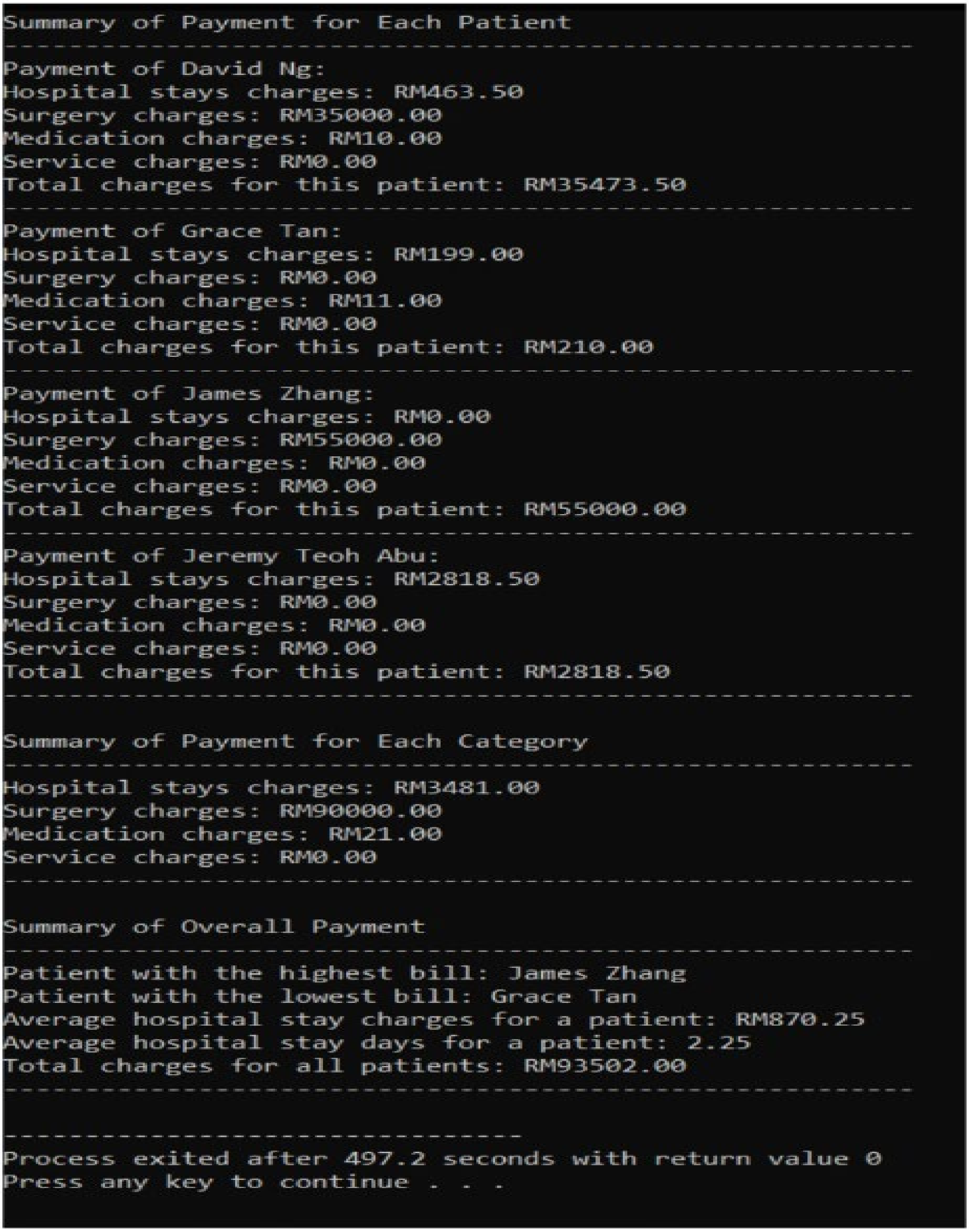
```
Please enter the number of days that the patient has stayed in hospital: 4
```

```
Types of Rooms
-----------------------------
1. Deluxe Suite
2. Single Deluxe
3. Single Standard
4. Two Bedded
5. Four Bedded
6. ICU
7. Check Out
-----------------------------
Please pick an option (1 - 7): 1
```

```
Types of Meals
-----------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
-----------------------------
Please pick an option (1 - 4): 2

Types of Meals
-----------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
-----------------------------
Please pick an option (1 - 4): 1

Types of Meals
-----------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
-----------------------------
Please pick an option (1 - 4): 1

Types of Meals
-----------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
-----------------------------
Please pick an option (1 - 4): 3
```

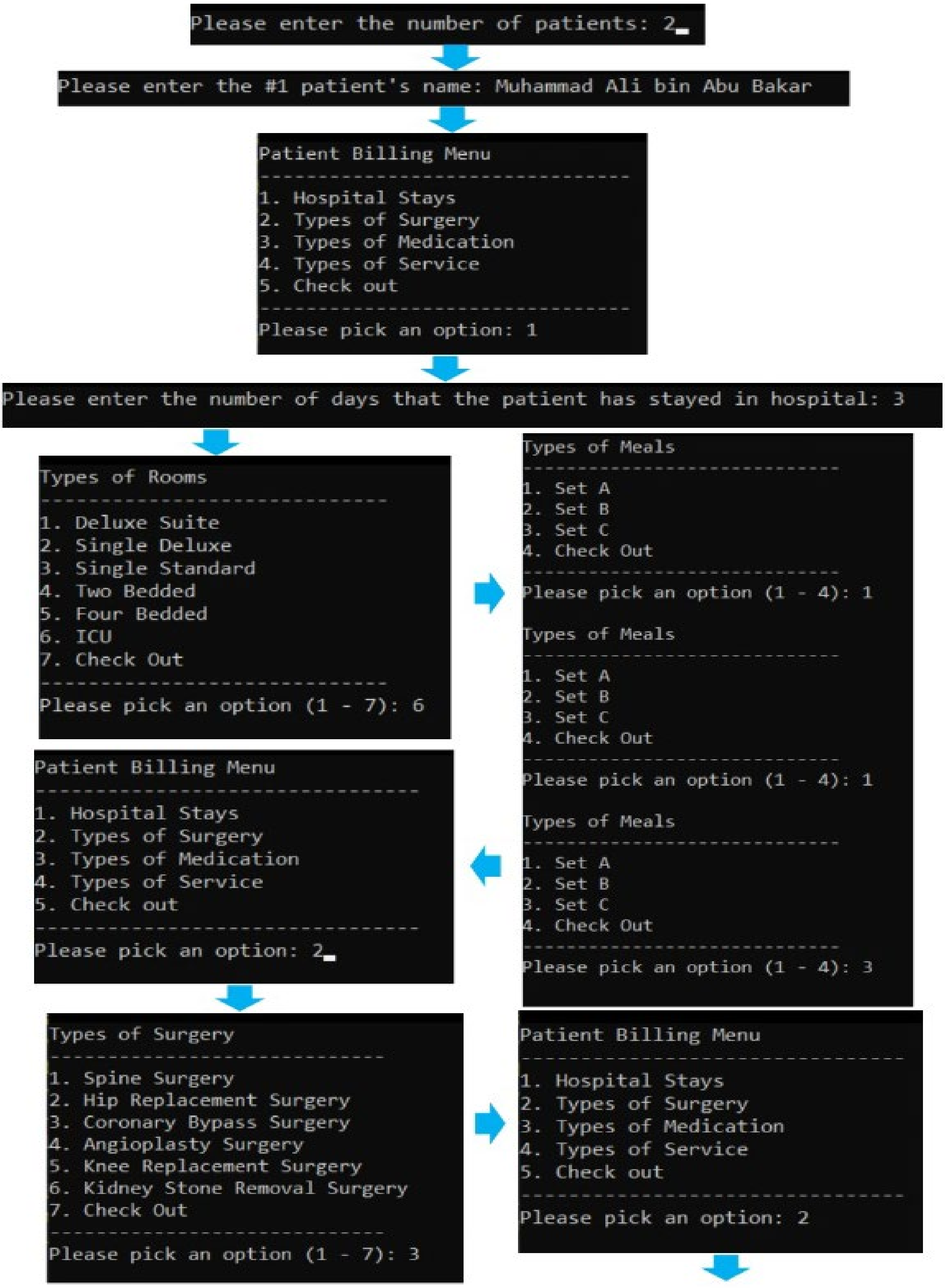
```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 5
```

Summary of Sample Output #2



```
Summary of Payment for Each Patient
--------------------------------------------------------
Payment of David Ng:
Hospital stays charges: RM463.50
Surgery charges: RM35000.00
Medication charges: RM10.00
Service charges: RM0.00
Total charges for this patient: RM35473.50
--------------------------------------------------------
Payment of Grace Tan:
Hospital stays charges: RM199.00
Surgery charges: RM0.00
Medication charges: RM11.00
Service charges: RM0.00
Total charges for this patient: RM210.00
--------------------------------------------------------
Payment of James Zhang:
Hospital stays charges: RM0.00
Surgery charges: RM55000.00
Medication charges: RM0.00
Service charges: RM0.00
Total charges for this patient: RM55000.00
--------------------------------------------------------
Payment of Jeremy Teoh Abu:
Hospital stays charges: RM2818.50
Surgery charges: RM0.00
Medication charges: RM0.00
Service charges: RM0.00
Total charges for this patient: RM2818.50
--------------------------------------------------------

Summary of Payment for Each Category
--------------------------------------------------------
Hospital stays charges: RM3481.00
Surgery charges: RM90000.00
Medication charges: RM21.00
Service charges: RM0.00
--------------------------------------------------------

Summary of Overall Payment
--------------------------------------------------------
Patient with the highest bill: James Zhang
Patient with the lowest bill: Grace Tan
Average hospital stay charges for a patient: RM870.25
Average hospital stay days for a patient: 2.25
Total charges for all patients: RM93502.00
--------------------------------------------------------

--------------------------------
Process exited after 497.2 seconds with return value 0
Press any key to continue . . .
```

Sample Output #3



```
Please enter the number of patients: 2
```

```
Please enter the #1 patient's name: Muhammad Ali bin Abu Bakar
```

```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 1
```

```
Please enter the number of days that the patient has stayed in hospital: 3
```

```
Types of Rooms
------------------------------
1. Deluxe Suite
2. Single Deluxe
3. Single Standard
4. Two Bedded
5. Four Bedded
6. ICU
7. Check Out
------------------------------
Please pick an option (1 - 7): 6
```

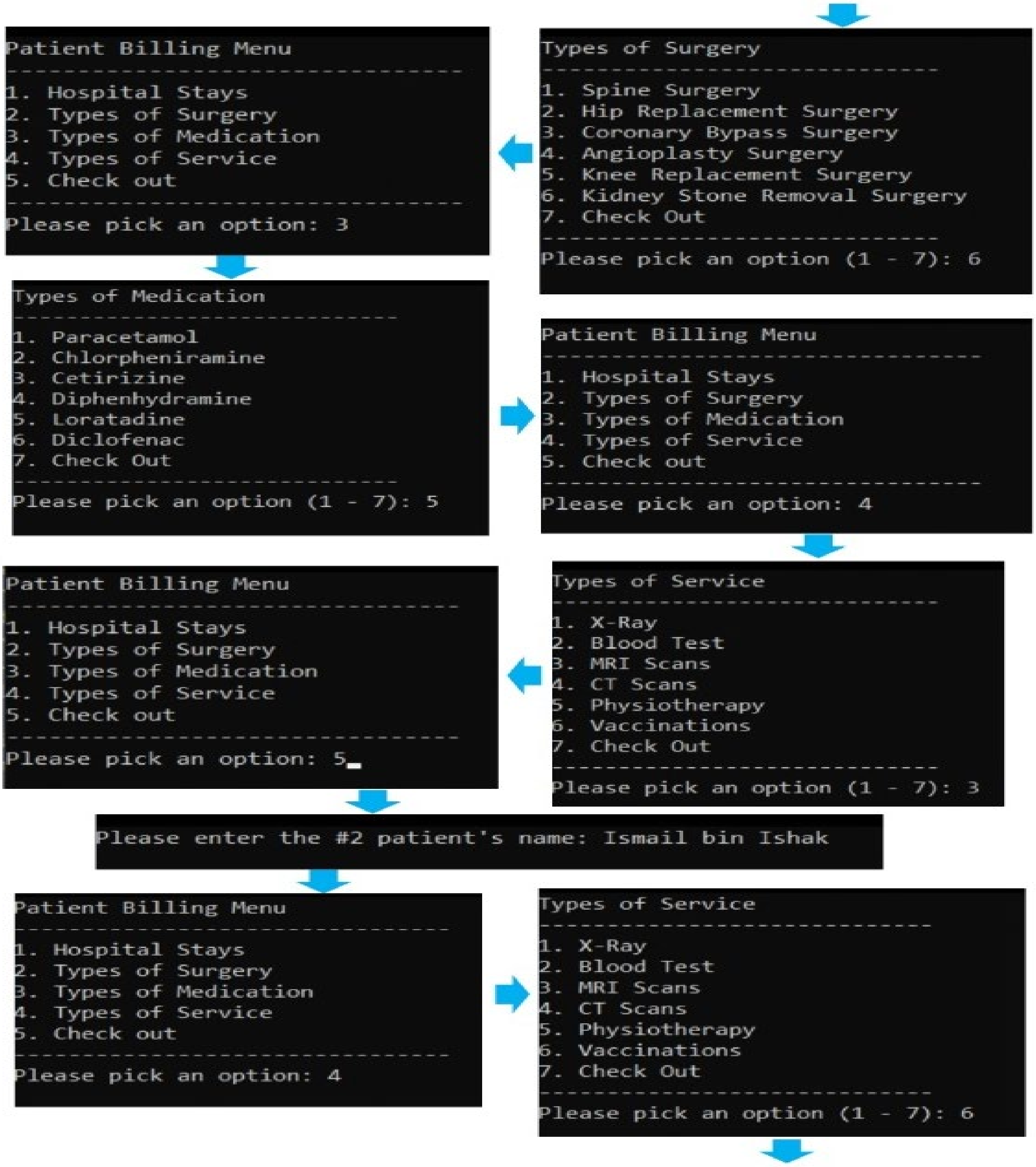
```
Types of Meals
------------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
------------------------------
Please pick an option (1 - 4): 1

Types of Meals
------------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
------------------------------
Please pick an option (1 - 4): 1

Types of Meals
------------------------------
1. Set A
2. Set B
3. Set C
4. Check Out
------------------------------
Please pick an option (1 - 4): 3
```

```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 2
```

```
Types of Surgery
------------------------------
1. Spine Surgery
2. Hip Replacement Surgery
3. Coronary Bypass Surgery
4. Angioplasty Surgery
5. Knee Replacement Surgery
6. Kidney Stone Removal Surgery
7. Check Out
------------------------------
Please pick an option (1 - 7): 3
```

```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 2
```

Continuation of sample Output #3



```
Types of Surgery
------------------------------
1. Spine Surgery
2. Hip Replacement Surgery
3. Coronary Bypass Surgery
4. Angioplasty Surgery
5. Knee Replacement Surgery
6. Kidney Stone Removal Surgery
7. Check Out
------------------------------
Please pick an option (1 - 7): 6
```

```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 3
```

```
Types of Medication
------------------------------
1. Paracetamol
2. Chlorpheniramine
3. Cetirizine
4. Diphenhydramine
5. Loratadine
6. Diclofenac
7. Check Out
------------------------------
Please pick an option (1 - 7): 5
```

```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 4
```

```
Types of Service
------------------------------
1. X-Ray
2. Blood Test
3. MRI Scans
4. CT Scans
5. Physiotherapy
6. Vaccinations
7. Check Out
------------------------------
Please pick an option (1 - 7): 3
```

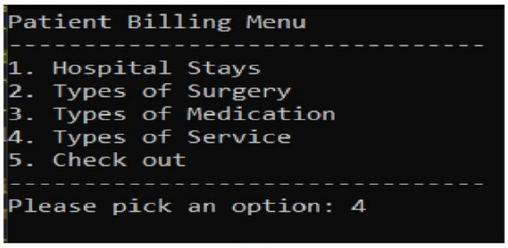
```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 5_
```

```
Please enter the #2 patient's name: Ismail bin Ishak
```

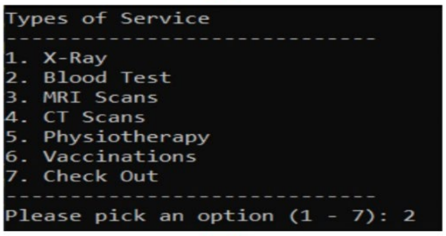
```
Patient Billing Menu
----------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
----------------------------------
Please pick an option: 4
```

```
Types of Service
------------------------------
1. X-Ray
2. Blood Test
3. MRI Scans
4. CT Scans
5. Physiotherapy
6. Vaccinations
7. Check Out
------------------------------
Please pick an option (1 - 7): 6
```

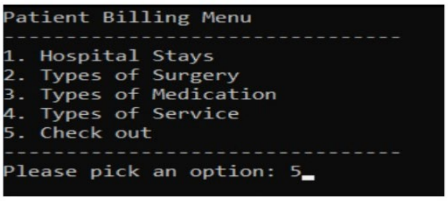
Continuation of sample Output #3



```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 4
```

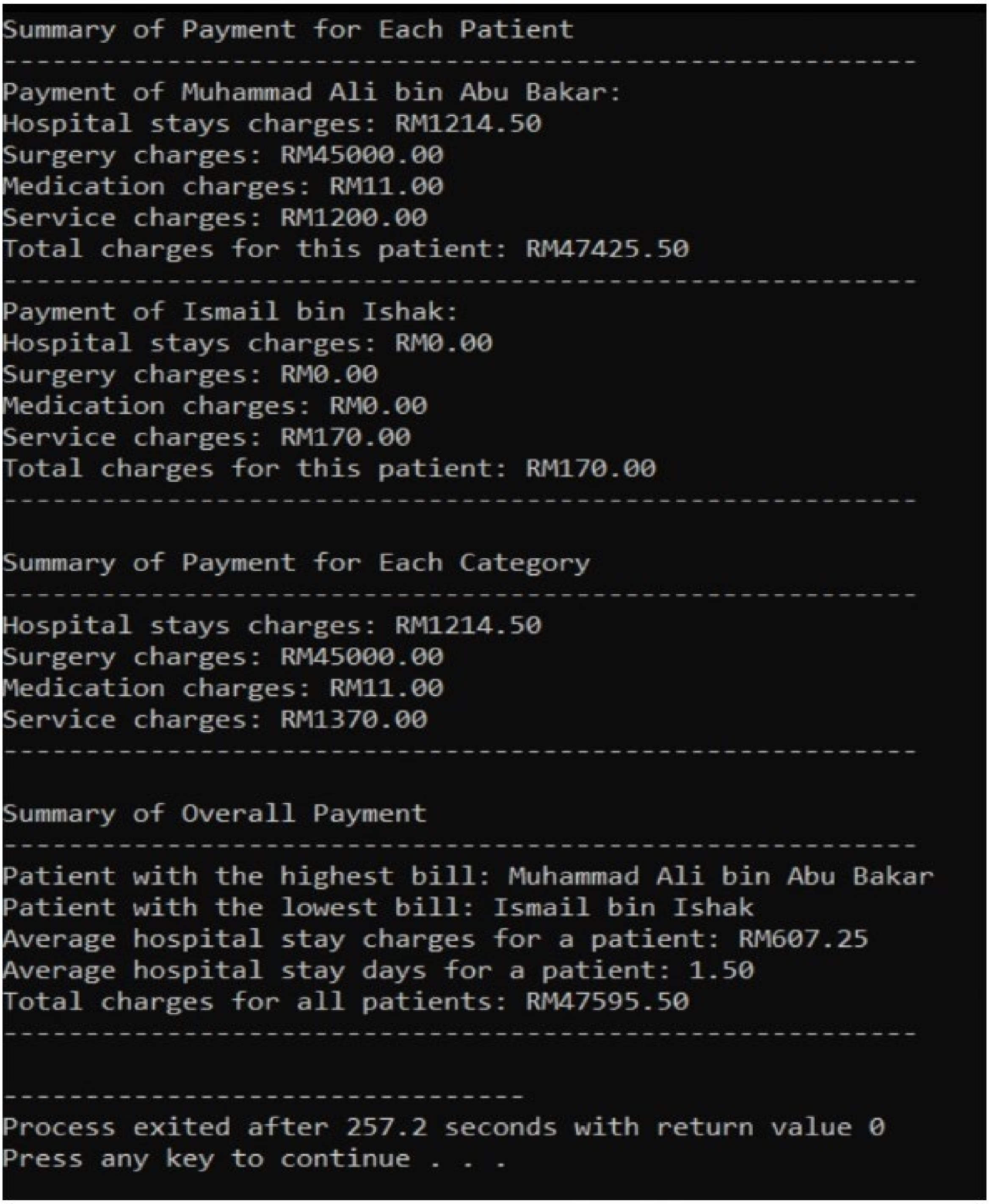


```
Types of Service
-----------------------------
1. X-Ray
2. Blood Test
3. MRI Scans
4. CT Scans
5. Physiotherapy
6. Vaccinations
7. Check Out
-----------------------------
Please pick an option (1 - 7): 2
```



```
Patient Billing Menu
--------------------------------
1. Hospital Stays
2. Types of Surgery
3. Types of Medication
4. Types of Service
5. Check out
--------------------------------
Please pick an option: 5_
```

Summary of Sample Output #3



```
Summary of Payment for Each Patient
--------------------------------------------------------
Payment of Muhammad Ali bin Abu Bakar:
Hospital stays charges: RM1214.50
Surgery charges: RM45000.00
Medication charges: RM11.00
Service charges: RM1200.00
Total charges for this patient: RM47425.50
--------------------------------------------------------
Payment of Ismail bin Ishak:
Hospital stays charges: RM0.00
Surgery charges: RM0.00
Medication charges: RM0.00
Service charges: RM170.00
Total charges for this patient: RM170.00
--------------------------------------------------------

Summary of Payment for Each Category
--------------------------------------------------------
Hospital stays charges: RM1214.50
Surgery charges: RM45000.00
Medication charges: RM11.00
Service charges: RM1370.00
--------------------------------------------------------

Summary of Overall Payment
--------------------------------------------------------
Patient with the highest bill: Muhammad Ali bin Abu Bakar
Patient with the lowest bill: Ismail bin Ishak
Average hospital stay charges for a patient: RM607.25
Average hospital stay days for a patient: 1.50
Total charges for all patients: RM47595.50
--------------------------------------------------------


--------------------------------
Process exited after 257.2 seconds with return value 0
Press any key to continue . . .
```