ARU Cambridge Campus ATTEMPT: 1	

ANGLIA RUSKIN UNIVERSITY

Assignment Coversheet

STUDENT DETAILS

Student Number:	**1810663/1**

FACULTY

Faculty of Arts, Humanities and Social Sciences

ASSIGNMENT DETAILS

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Module Element	**010 - COURSEWORK ASSIGNMENT 3000 WORDS**
Submission date (by 2pm)	**03 May 2019**
Your lecturer's name	

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Signature of Marker	Date	% Mark (Un-moderated)

2019

Project Report – Fundamentals of Computing

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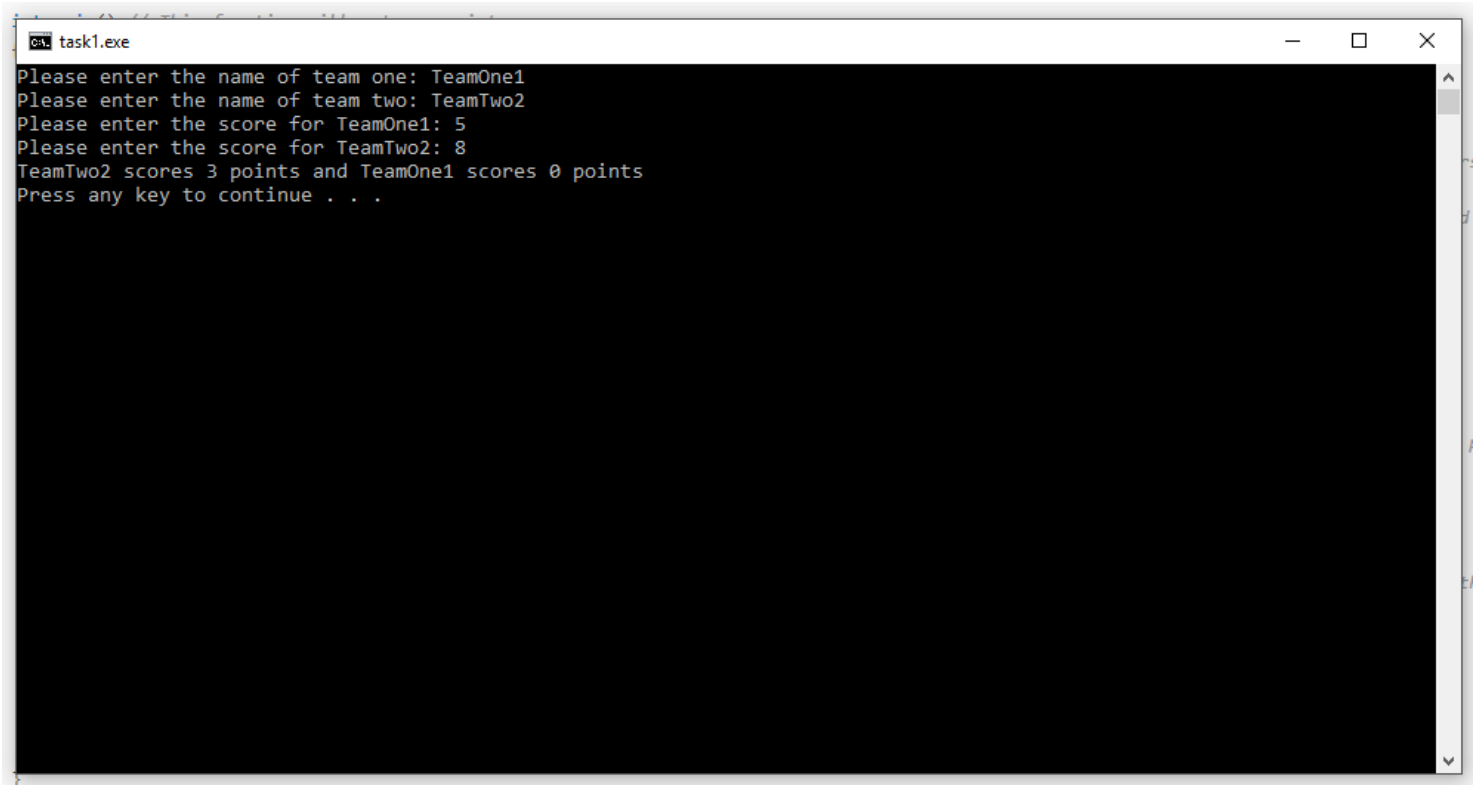
2019 MOD002549 SEM2 F01CAM

Task 1

This program takes the names of two teams and the scores for each team. It then compares the scores and prints a different message depending on which team scored more or if it was a draw.

```c
#include <stdio.h>
int main() // This function will return an integer
{
    char nameTeam1[20]; //Declares variable "nameTeam1" which has 20 characters
    char nameTeam2[20]; //Declares variable "nameTeam2"  which also has 20 characters
    int team1Score, team2Score; //Declares two integer variables "team1Score" and "team2Score"
    printf("Please enter the name of team one: "); //Prints a statement for the user, requesting them to enter the desired name of the first team
    scanf("%s", nameTeam1); //This line takes the input from the user and assigns it to the variable "nameTeam1"
    printf("Please enter the name of team two: "); //Repeats the same process for "nameTeam2" to request and assign the name of the second team
    scanf("%s", nameTeam2);
    printf("Please enter the score for %s: ", nameTeam1); //Requests the score for the first named team
    scanf("%d", & team1Score); //Assigns the user input to variable "team1Score"
    printf("Please enter the score for %s: ", nameTeam2); //Repeats the process for "team2Score"
    scanf("%d", & team2Score);
    if (team1Score > team2Score) //If statement which checks if the integer value for "team1Score" is higher than "team2Score"
    {
        printf("%s scores 3 points and %s scores 0 points \n", nameTeam1, nameTeam2 ); //If the statement is true print that they score 3 points and the second team scores 0
    }
    else //If the statement is not true, carrys on to the next if statement
      if (team1Score < team2Score) //Compares the two vales to see if the second team's score value is higher than the team's
        {
            printf("%s scores 3 points and %s scores 0 points \n", nameTeam2, nameTeam1 ); //Print that the second team get 3 points and the first team gets 0
        }
        else //If neither statements are met then both teams must have the same score
    {
            printf("Both %s and %s score 1 point \n", nameTeam1, nameTeam2); //Since it must be a draw, both teams recieve 1 point
    }
    return 0; //The function returns integer 0
}
```



Task 2

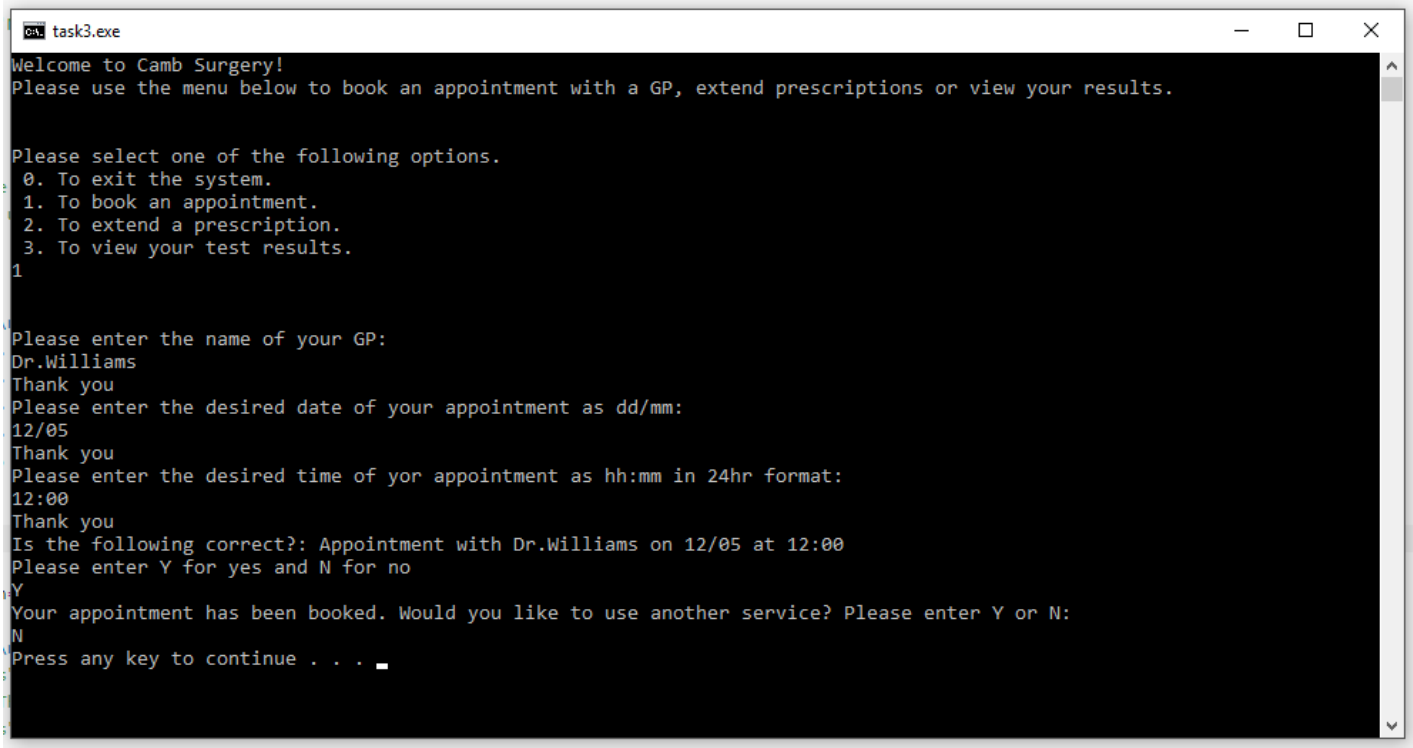
This program takes student's names and test scores and assigns a grade based on the mark. The code checks the value of "mark" against the grade boundaries to decide which grade to display. It also increments each counter for grades to keep a list of how many of each grade has been achieved by the students. It then asks if more student information will be inputted and loops for the answer 'Y'.

```c
#include <stdio.h>

int main() //Starts a function that will return an integer
{
    char name[20], response, grade; //Initialises 3 string variables
    int mark, Fcount=0, Dcount=0, Ccount=0, Bcount=0, Acount=0; //Initialises the marks integer variable
    do {  //Starts a do while loop
      printf("Enter a student name: "); //Asks the user to input the student name
      scanf("%s", name); //reads the input from the user and assigns the pointer to the variable "name" as a string
      printf("Enter the student's mark: "); //Asks the user to input the student's mark
      scanf("%d", &mark); //reads the input from the user and assigns the pointer to the variable "mark" as an integer
      printf("%s", name); //Outputs the name of the student from the variable "name"
      printf(" recieves the grade: "); //Outputs a string to form a sentence containing the student's name and grade
      if (mark < 40){ //Checks if the value of "mark" is less than 40
        printf("F"); //If so, the outputted grade is an F
        Fcount = Fcount+1;
        } //closes the if loop
      else if (mark <= 49){ //If the previous statement isn't true, checks to see if "mark" is less than or equal to 49
          printf("D"); //If so, the outputted grade is a D
          Dcount = Dcount+1;
        } //closes the if loop
          else if (mark <= 59){ //If the previous statement also isn't true, checks to see if "mark" is less than or equal to 59
            printf("C"); //If so, the outputted grade is a C
            Ccount = Ccount+1;
    } //closes the if loop
            else if (mark <= 69){ //If the previous statement also isn't true, checks to see if "mark" is less than or equal to 69
              printf("B"); //If so, the outputted grade is a B
              Bcount = Bcount+1;
      } //closes the if loop
            else { //If all the previous statements are false then the grade must be higher than 69 so another if statement is not necessary
              printf("A"); //If so, the outputted grade must be an A
              Acount = Acount+1;
      } //closes the if loop
      getchar(); //reads a single character from stdin
      printf("\n\nNumber of students with F: %d \nNumber of students with D: %d \nNumber of students with C: %d \nNumber of students with B: %d \nNumber of students with A: %d ", Fcount, Dcount, Ccount, Bcount, Acount);
      printf("\n\nDo you want to add another student? Type Y for yes and N for No\n");
      scanf("%c", &response);
    } while (response == 'Y');
    return 0;
}
```

```
task2.exe
Enter a student name: Ben
Enter the student's mark: 78
Ben recieves the grade: A

Number of students with F: 0
Number of students with D: 0
Number of students with C: 0
Number of students with B: 0
Number of students with A: 1

Do you want to add another student? Type Y for yes and N for No
Y
Enter a student name: Ned
Enter the student's mark: 66
Ned recieves the grade: B

Number of students with F: 0
Number of students with D: 0
Number of students with C: 0
Number of students with B: 1
Number of students with A: 1

Do you want to add another student? Type Y for yes and N for No
Y
Enter a student name: Ted
Enter the student's mark: 22
Ted recieves the grade: F

Number of students with F: 1
Number of students with D: 0
Number of students with C: 0
Number of students with B: 1
Number of students with A: 1

Do you want to add another student? Type Y for yes and N for No
N
Press any key to continue . . .
```

Task 3

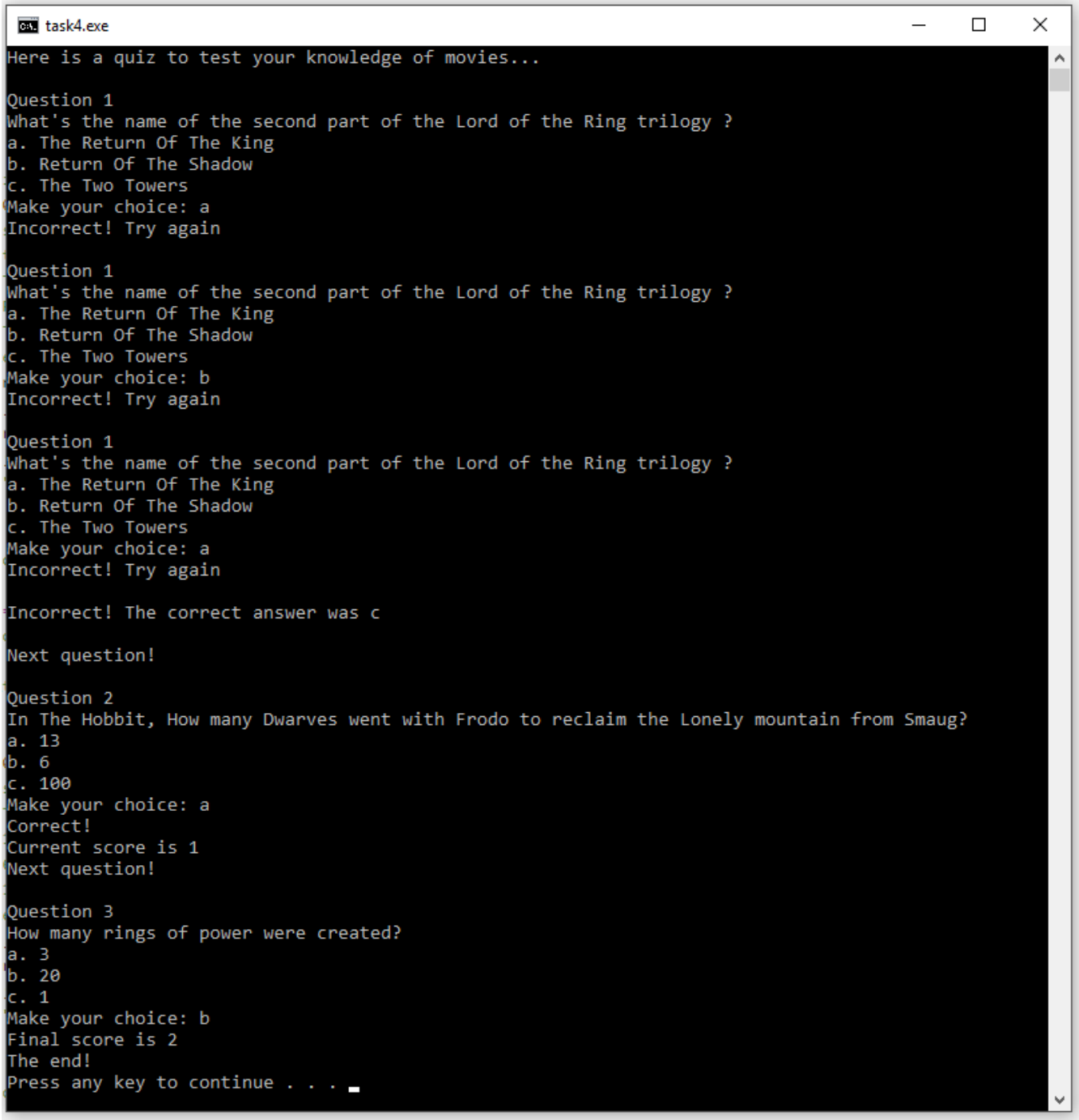
This program displays a menu for 4 options, exit, booking an appointment, extending a prescription and viewing test results. When selected, the 0th option exits the program with a break command. the 1st option requests the GP's name, date of appointment and time then repeats it to the user for confirmation. They can then choose to re-input this information or accept it and move on. The program then prompts the user if they'd like to use another service where they can choose to pick from the menu again or close the program with another break. The second option asks for a prescription ID and the length of time they'd like to extend it by in days. It again repeats this information to the user and asks for confirmation before asking to continue with another service. The 3rd option requires the user to input a test ID, asks for confirmation, then "prints" the hypothetical test results and asks if the user would like to use another service again.



```c
#include <stdio.h>

int main()
{
    char cont='Y';
    char patientName[20];
    char dob[10];
    char doctorName[20];
    char appointmentDate[20];
    char time[5];
    char response='N';
    int option;
    char prescID;
    int prescETX;
    char testID;

    printf("Welcome to Camb Surgery!\n");
    printf("Please use the menu below to book an appointment with a GP, extend prescriptions or view your results.\n");

    for(;;) {

        printf("\n\nPlease select one of the following options.\n");
        printf(" 0. To exit the system.\n");
        printf(" 1. To book an appointment.\n");
        printf(" 2. To extend a prescription.\n");
        printf(" 3. To view your test results.\n");
        scanf("%d", &option);

  if (option== 0){
          break;
        }
    else if (option== 1) {
       do{
          printf("\n\nPlease enter the name of your GP: \n" );
          scanf("%s", &doctorName);
          printf("Thank you\nPlease enter the desired date of your appointment as dd/mm: \n");
          scanf("%s", &appointmentDate);
          printf("Thank you\nPlease enter the desired time of yor appointment as hh:mm in 24hr format: \n" );
          scanf("%s", &time);
          printf("Thank you\nIs the following correct?: Appointment with " );
          printf("%s", doctorName);
          printf(" on %s", appointmentDate);
          printf(" at %s\n", time);
          printf("Please enter Y for yes and N for no\n" );
          scanf(" %c", &response);
        }while (response== 'N');
          printf("Your appointment has been booked. Would you like to use another service? Please enter Y or N: \n");
          scanf(" %c", &cont);
          if (cont== 'N'){
            break;
          }
    }
    else if (option== 2) {
       do{
         fflush(stdin); //empties the buffer. To be used before you read a string.
          printf("\n\nPlease enter the prescription identifier of the prescription you would like to extend: \n");
          scanf(" %s", &prescID);
          printf("\nHow many days would you like to extend this prescription for?\n");
          scanf(" %d", &prescETX);
          printf("\nTo confirm, you would like to extend prescription ID: %s for a total of %d days? Please enter Y or yes and N for no\n", prescID, prescETX);
          scanf(" %c", &response);
       }while (response== 'N');
          printf("Your prescription has been extended. Would you like to use another service? Please enter Y or N: \n");
          scanf(" %c", &cont);
          if (cont== 'N'){
            break;
          }
        }
    else if (option== 3){
      do{
          printf("\n\nPlease enter your test result identifier: \n");
          scanf(" %s", &testID);
          printf("\nYou have requested the results for test: %s. Is this correct? Please enter Y or yes and N for no\n", testID);
          scanf(" %c", &response);
      }while (response== 'N');
          printf("\n The results of your test are now printing. Would you like to use another service? Please enter Y or N: \n");
          scanf(" %c", &cont);
          if (cont== 'N'){
            break;
          }
        }
  }

}
return 0;
}
```

Task 4

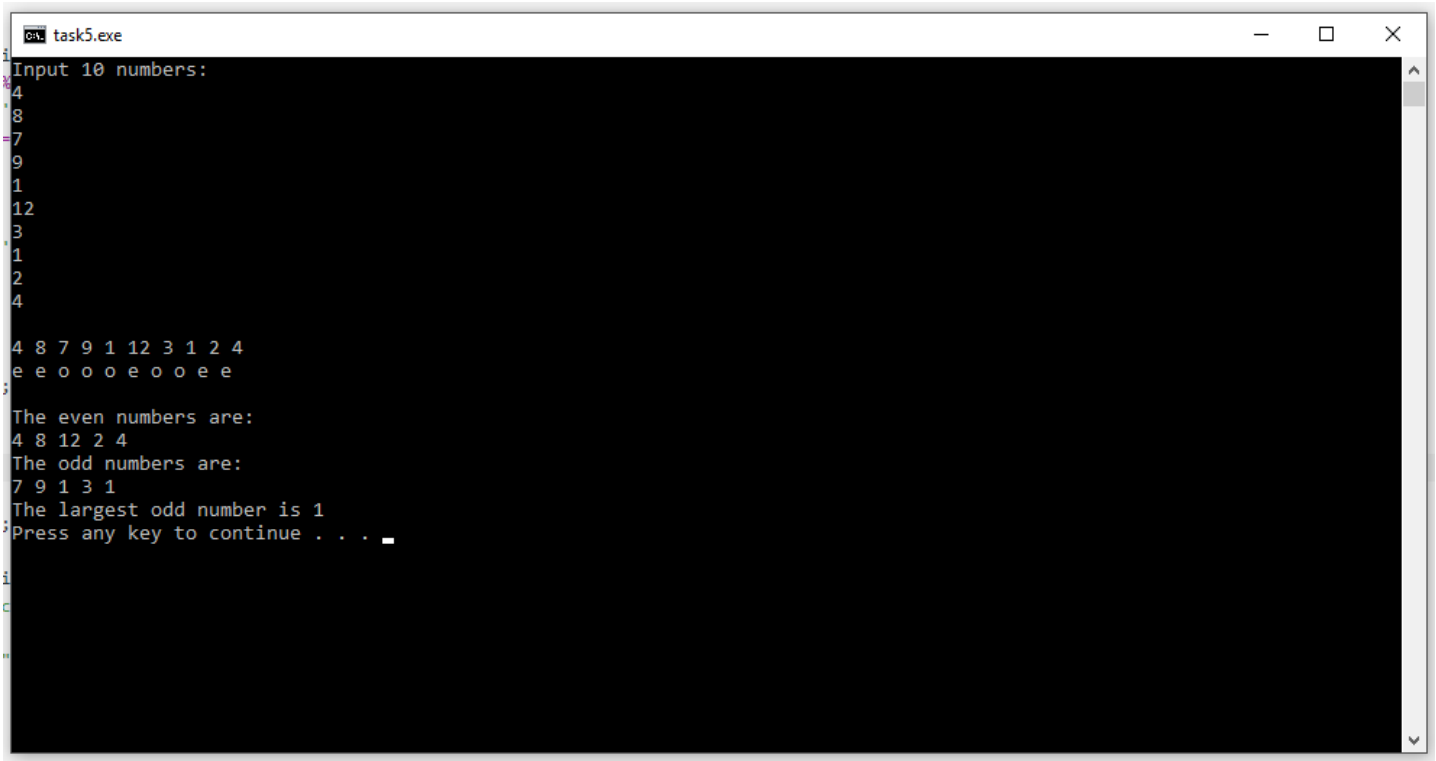
This program is a quiz that gives the user 3 question to answer, picking from 3 possible answers and giving 3 chances to get it correct before moving on. The variable “chances” is set before each question and iterates every time the question is answered. If it reaches 3, the correct answer is revealed and the question is skipped. If the correct answer is entered, the “score” variable is incremented and the next question is displayed. After all 3 questions, the end score is revealed.



```c
#include <stdio.h>

int main()
{
    char answer;
    int chances;
    int score=0;


    printf("Here is a quiz to test your knowledge of movies...\n\n");
    for (chances=0; chances < 3; ++chances){
      printf("Question 1\n");
      printf("What's the name of the second part of the Lord of the Ring trilogy ?\n");
      printf("a. The Return Of The King\n");
      printf("b. Return Of The Shadow\n");
      printf("c. The Two Towers\n");
      printf("Make your choice: ");
      fflush(stdin);
      scanf(" %c", &answer);
        if (answer == 'c'){
          ++score;
          printf("Correct!\nCurrent score is %d \n", score);
          break;
        }
      printf("Incorrect! Try again\n\n");
    }
    if (chances == 3){
      printf("Incorrect! The correct answer was c \n");
      }
    printf("\nNext question!\n\n");


    for (chances=0; chances < 3; ++chances){
      printf("Question 2\n");
      printf("In The Hobbit, How many Dwarves went with Frodo to reclaim the Lonely mountain from Smaug?\n");
      printf("a. 13\n");
      printf("b. 6\n");
      printf("c. 100\n");
      printf("Make your choice: ");
      scanf(" %c", &answer);
        if (answer == 'a'){
          ++score;
          printf("Correct!\nCurrent score is %d", score);
          break;
        }
      printf("Incorrect! Try again\n\n");
    }
    if (chances == 3){
      printf("Incorrect! The correct answer was a \n");
      }
    printf("\nNext question!\n\n");


    for (chances=0; chances < 3; ++chances){
      printf("Question 3\n");
      printf("How many rings of power were created?\n");
      printf("a. 3\n");
      printf("b. 20\n");
      printf("c. 1\n");
      printf("Make your choice: ");
      scanf(" %c", &answer);
        if (answer == 'b'){
          ++score;
          break;
        }
      printf("Incorrect! Try again\n\n");
    }
    if (chances == 3){
      printf("Incorrect! The correct answer was b \n");
      }
    printf("Final score is %d", score);
    printf("\nThe end!\n");
}
```

Task 5

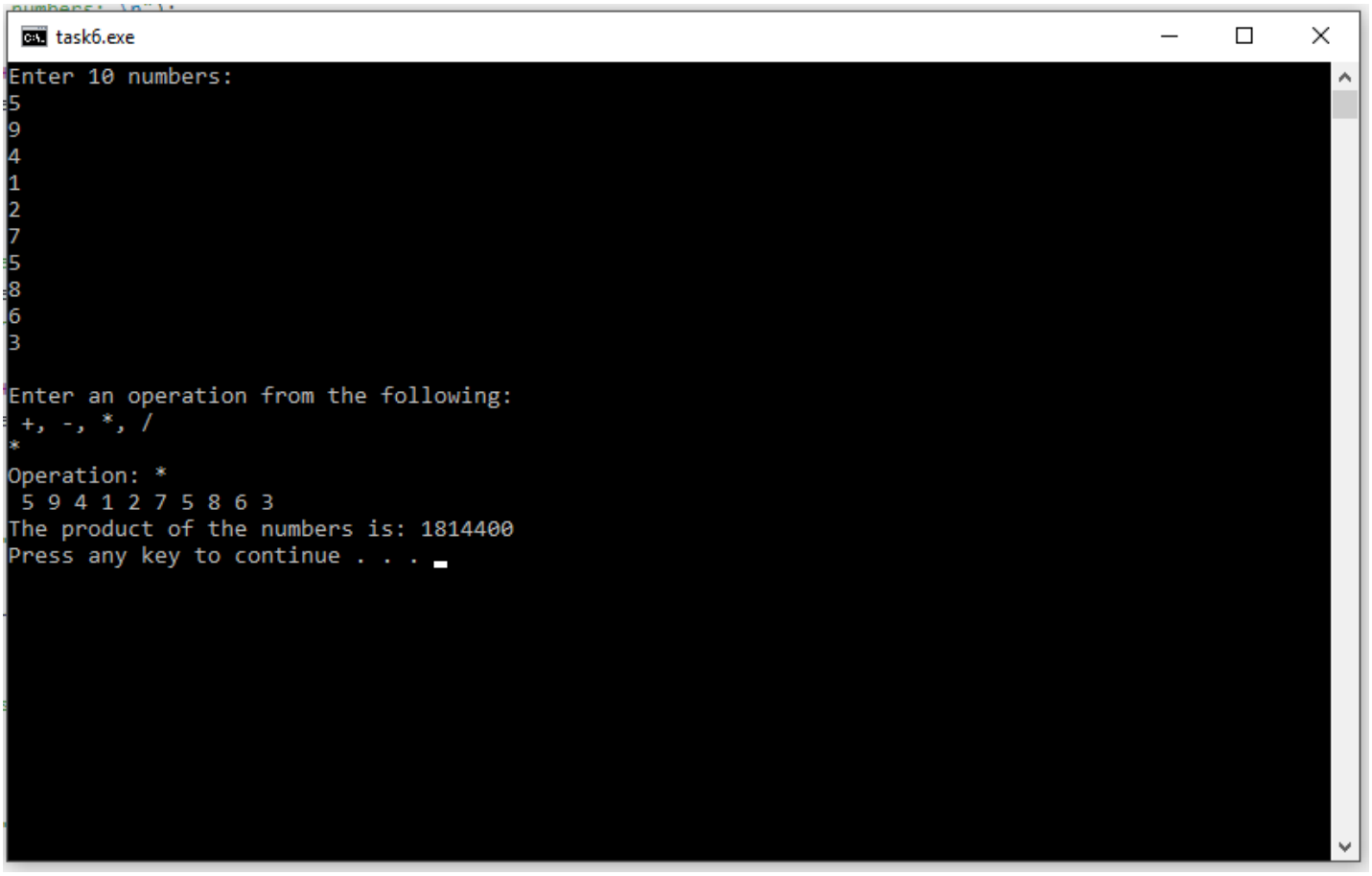
This program finds the largest odd number out of 10 inputted numbers. First, it checks each number in the array to see if it's odd or even. It prints the numbers and an 'o' or 'e' to show if they are odd or even. It then sorts them into two separate arrays, one for even numbers and one for odd numbers and displays both arrays. Lastly, it compares every value in the odd array to find the largest value and assigns that to the 'big' value which is then printed. If there were no odd numbers, then the value of 'big' will be the same as what it was when it was initialised, zero, so it prints that there were no odd numbers.



```c
#include <stdio.h>

int main()
 {
   int arr[10], i, j, x=0, y=0, even[10], odd[10], big=0;
   char oe[10];

   printf("Input 10 numbers:\n");

   for (i = 0; i < 10; i++){
      scanf(" %d", &arr[i]);
    }

    for (i = 0; i < 10; i++){
      if(arr[i] % 2 == 0){
        oe[i] = 'e';
        even[y] = arr[i];
        y++;
      }
      else{
        oe[i] = 'o';
        odd[x] = arr[i];
        x++;
      }
    }
    printf("\n");

   for (i = 0; i < 10; i++){
      printf("%d ", arr[i]);
    }
    printf("\n");

    for (i = 0; i < 10; i++){
       printf("%c ", oe[i]);
     }
    printf("\n\n");

     printf("The even numbers are: \n");
     for (i = 0; i < y; i++){
        printf("%d ", even[i]);
      }
      printf("\n");

      printf("The odd numbers are: \n");
      for (i = 0; i < x; i++){
         printf("%d ", odd[i]);
       }
      printf("\n");

      for (i = 0; i < x; i++){
        if(odd[i]>odd[i+1])
          big = odd[i];
       }

       if (big==0){
         printf("There were no odd numbers");
       }else{
       printf("The largest odd number is %d\n", big);
     }


   return 0;
 }
```

Task 6

This program takes 10 values then performs an operation on them chosen by the user. First, the 10 values are inputted by the user and stored in an array. The user then enters one of the 4 operators shown in the console and the operation is completed on the values in the array. Depending on the operation, each number from the array is added, subtracted, multiplied or divided from each other to produce the end value which is then printed.

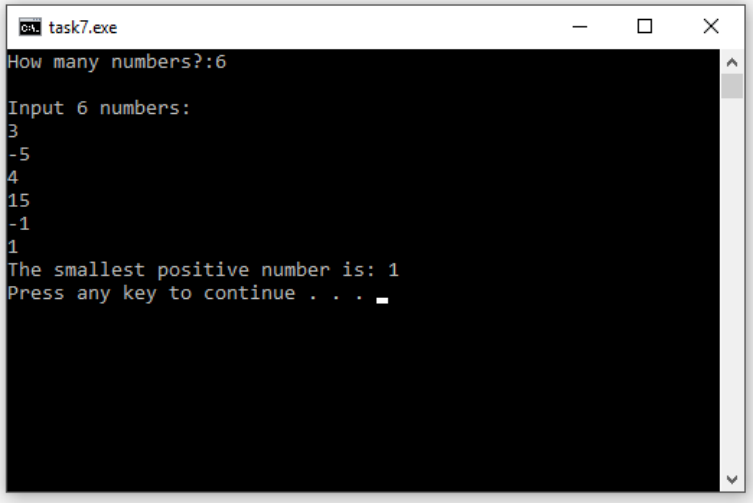


```c
#include <stdio.h>

int main()
{
  int arr[10], x, sum=0, mult=0, div=0, sub=0;
  char operation;

  printf("Enter 10 numbers: \n");

  for(x=0; x<10; x++){
    scanf(" %d", &arr[x]);
  }

  do{

  printf("\nEnter an operation from the following: \n +, -, *, / \n");
  scanf(" %c", &operation);
  printf("Operation: %c \n", operation);

  for(x=0; x<10; x++){
    printf(" %d", arr[x]);
  }


  if(operation == '+'){
    for(x=0; x<10; x++){
      sum=arr[x]+sum;
    }

    printf("\nThe sum of the numbers is: %d\n", sum);
  break;
  }

  if(operation == '-'){
    sub=arr[0];
    for(x=1; x<10; x++){
      sub=sub-arr[x];
    }

    //sub=sub-arr[9];
    printf("\nThe numbers subtracted from eachother equal to: %d\n", sub);
  break;
  }

  if(operation == '*'){
    mult=arr[0];
    for(x=1; x<10; x++){
      mult=arr[x]*mult;
    }
    printf("\nThe product of the numbers is: %d\n", mult);
  break;
  }

  if(operation =='/'){
    div=arr[0];
    for(x=1; x<10; x++){
      div=div/arr[x];
    }
    printf("\nEach number divided by the next is equal to: %d\n", div);
  break;
  }

  }while(operation != ('+'|'-'|'*'|'/'));

return 0;
}
```

Task 7

This program prints the smallest possible number from a set of inputted numbers. First, the number of values is inputted so we know how many times to iterate in a later section. Next, the numbers are entered and go into an array. Each value in this array is now checked to see if it's positive. If so, it goes into a separate array for positive numbers. This array is then fed into the "smallest" function that checks one value against another and returns the smallest. This is repeated for the whole positive array then the smallest positive number is printed.

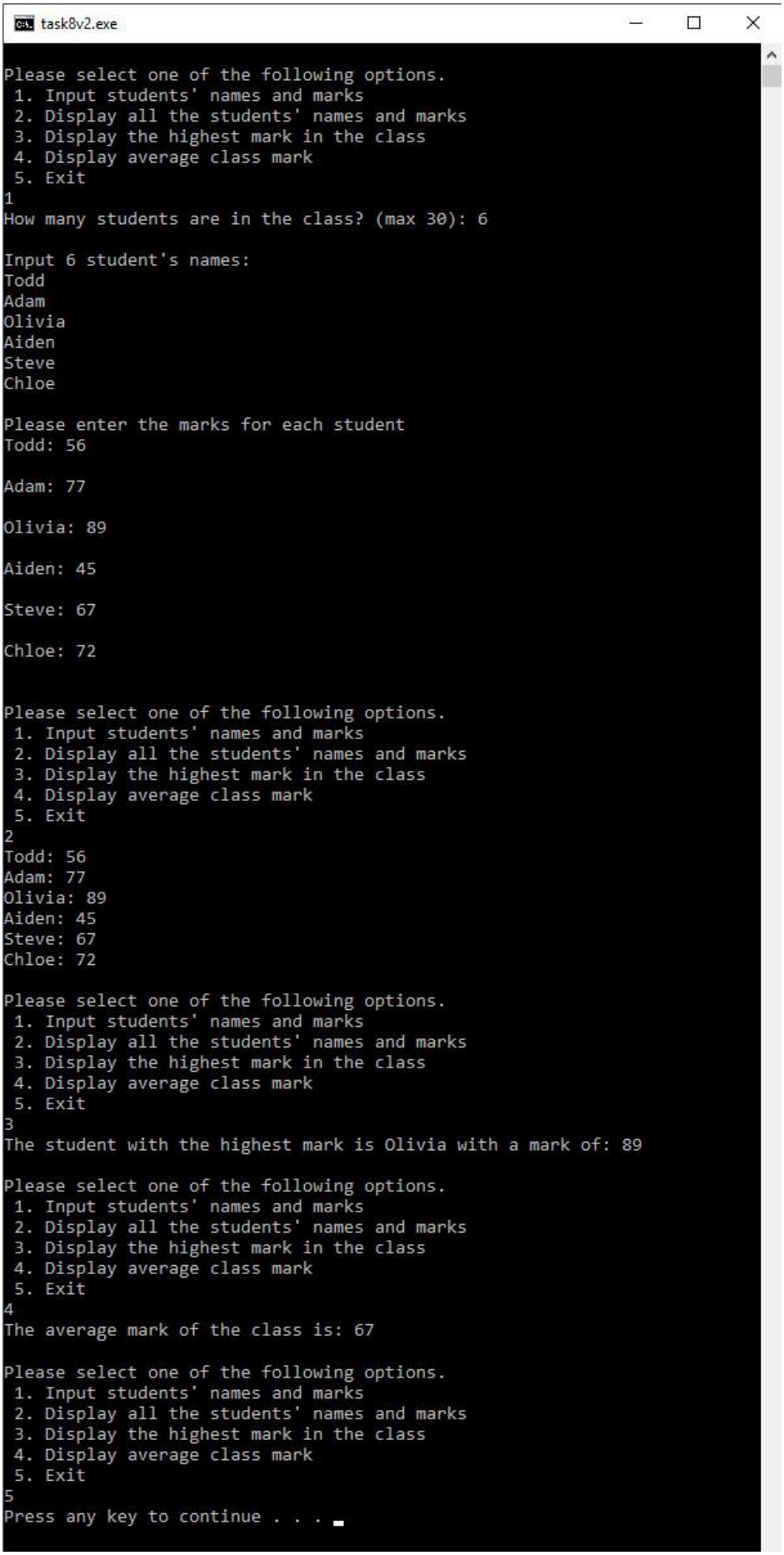
```c
#include <stdio.h>

int smallest(int num1, int num2)
{
  if(num1 > num2){
    return num2;
  }else
  return num1;
}

int main()
{
  int arr[10], pos[10], i, x, j=0, small;

  printf("How many numbers?:");
  scanf(" %d", &x);
  printf("\nInput %d numbers:\n", x);
  for (i = 0; i < x; i++){
     scanf(" %d", &arr[i]);
   }

  for (i = 0; i < x; i++){
     if(arr[i]>0){
      pos[j] = arr[i];
      j++;
    }
   }

   small = pos[0];
   for (i = 1; i < j; i++){
      small = smallest(small, pos[i]);
    }

  printf("The smallest positive number is: %d\n", small);

return 0;
}
```



Task 8

This program serves as a system to store, process and display student's marks. First, the main function starts an infinite loop in which it calls the "printMenu" function to display the menu and options. The 1st option runs the function "students" which asks for the user to input the number of students in the class and their names and marks respectively by putting them into two arrays, "name" and "mark". The 2nd option calls the function "printStudents" which prints out the student's names and marks from these arrays. The 3rd option calls the "highMark" function which checks each value in the mark array and finds the largest number. It then takes that number and copies the location of the largest value in the mark array and uses it to find the name of that student. It then prints both the name and mark of the student. The 4th option calls the function "highMark" which takes all the student's marks and creates an average for the class by adding each number together then dividing by the total number of students. It then prints this value. The 5th and final option exits the program with a break.

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

int x, i, option, stID, highest, avg=0;
int mark[30];
char name[30][10];

void printMenu()
{
      printf("\nPlease select one of the following options.\n");
      printf(" 1. Input students' names and marks\n");
      printf(" 2. Display all the students' names and marks\n");
      printf(" 3. Display the highest mark in the class\n");
      printf(" 4. Display average class mark\n");
      printf(" 5. Exit\n");
}

void students()
{
      printf("How many students are in the class? (max 30): ");
      scanf("%d", &x);

      printf("\nInput %d student's names:\n", x);
      for (i = 0; i < x; i++){
         fflush(stdin);
         scanf("%s", name[i]);
       }

      printf("\nPlease enter the marks for each student\n");
      for (i = 0; i < x; i++){
         printf("%s: ", name[i]);
         scanf(" %d", &mark[i]);
         printf("\n");
       }
}

void printStudents()
{
      for (i = 0; i < x; i++){
         printf("%s: ", name[i]);
         printf("%d\n", mark[i]);
      }
}

void highMark()
{
      highest = mark[0];
       for (i = 1; i < x; i++){
          if (mark[i] > highest){
            highest = mark[i];
            stID = i;
          }
      }
      printf("The student with the highest mark is %s with a mark of: %d\n", name[stID], highest);
}

void averageMark()
{
      for (i = 0; i < x; i++){
         avg += mark[i];
      }
      avg /= x;
      printf("The average mark of the class is: %d\n", avg);
}


int main ()
{
  for(;;){

        printMenu();
        scanf("%d", &option);

      if (option==1){

        students();

      }else if (option==2){

        printStudents();

     }else if (option==3){

        highMark();

     }else if (option==4){

        averageMark();

     }else if (option==5){
       break;
      }
    }
return 0;
}
```


task8v2.exe
Please select one of the following options.
1. Input students' names and marks
2. Display all the students' names and marks
3. Display the highest mark in the class
4. Display average class mark
5. Exit
1
How many students are in the class? (max 30): 6
Input 6 student's names:
Todd
Adam
Olivia
Aiden
Steve
Chloe
Please enter the marks for each student
Todd: 56
Adam: 77
Olivia: 89
Aiden: 45
Steve: 67
Chloe: 72
Please select one of the following options.
1. Input students' names and marks
2. Display all the students' names and marks
3. Display the highest mark in the class
4. Display average class mark
5. Exit
2
Todd: 56
Adam: 77
Olivia: 89
Aiden: 45
Steve: 67
Chloe: 72
Please select one of the following options.
1. Input students' names and marks
2. Display all the students' names and marks
3. Display the highest mark in the class
4. Display average class mark
5. Exit
3
The student with the highest mark is Olivia with a mark of: 89
Please select one of the following options.
1. Input students' names and marks
2. Display all the students' names and marks
3. Display the highest mark in the class
4. Display average class mark
5. Exit
4
The average mark of the class is: 67
Please select one of the following options.
1. Input students' names and marks
2. Display all the students' names and marks
3. Display the highest mark in the class
4. Display average class mark
5. Exit
5
Press any key to continue . . .