

C Programming

Learning Package 10

Application 2

Dr Scott Turner

School of Science and Technology

University of Northampton



**Introduction**

During this Learning Package the reader will practice designing and writing C programming using some of the ideas they have met up to this point.

**Study guide**

Session 1:

Task 10.1

Session 2:

Task 10.2

Session 3:

Task 10.3

Task 10.1

1. Write a program to display a Christmas tree (as a set of asterisks) and the message below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | \* |  |  |  |
|  |  | \* |  | \* |  |  |
|  | \* |  |  |  | \* |  |
| \* | \* | \* |  | \* | \* | \* |
|  | \* |  |  |  | \* |  |
| \* | \* | \* | \* | \* | \* | \* |
|  |  |  | \* |  |  |  |
|  |  |  | \* |  |  |  |
|  |  |  | \* |  |  |  |

Merry Christmas Figure 10.1

1. Write a program to calculate the amount of tip (sorry to any waiting staff) using the following rules:-
   1. When the service is rate 6 or above then tip is 15% of the price of the meal.
   2. When the service is less than 6 but greater than 3 then the tip is 10% of the price of the meal.
   3. Otherwise no tip.

* The user must enter when asked
  + their rating for the service
  + the price of the meal; price of the meal
* The computer must then display
  + the price of the meal
  + the total price.

1. Write two programs to show how the records for books in a library could be implemented. The first implementation was based around using arrays. The second implementation used arrays and structures. The programs must store the book name, author, and type of book and shelf the book is stored on. You can use codes for shelf and book type if you want (e.g. 1 for non- fiction or 4 for magazine).
2. Write a program

* to display a rocket on the screen (see figure 10.2),
* alter the program so that the user by entering a number can define how tall the rocket is.

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Figure 10.2

Task 10.2

Follow appendix C from the module textbook to build the Bridge Tutor.

Task 10.3

Write a noughts and crosses game that:

* Use arrays to store the grid
* Uses scanf and printf to put o or x into the grid and display it.
* Write functions
  + Fill the grid with -
  + to display the grid
  + to check that an element of the grid is not occupied
  + to store names and dates.
  + to check if there is a winner or draw and if either is true put up an appropriate message.
* Check for win or draw.

As a starting point:

#include <stdio.h>

int initial\_1(char \*p1); int display\_1(char \*p2);

int main()

{

char grid[3][3];

int x,y,loop1,loop2; char choice; initial\_1(grid); display\_1(grid); grid[1][2]='0';

display\_1(grid); system("PAUSE"); return 0;

}

int initial\_1(char \*p1)

{

int x1,y1;

for (x1=0;x1<3;x1++)

{

for (y1=0;y1<3;y1++)

{

\*p1='-'; p1++;

}

}

return 0;

}

int display\_1(char \*p2)

{

int x1,y1;

for (x1=0;x1<3;x1++)

{

printf("\n");

for (y1=0;y1<3;y1++)

{

printf("%c\t",\*p2); p2++;

}

}

printf("\n\n"); return 0;

}

Task 10.2

1. #include <stdio.h>

#include <stdlib.h>

int main()

{

int rate;

float meal,tip; scanf("%f",&meal);

scanf("%d",&rate); if (rate>=6)

tip=meal\*0.15;

else if ((rate>4)&&(rate<6)) tip=meal\*0.1;

else

tip=0;

printf("\nMeal = %f Total=%f",meal,meal+tip);

system("PAUSE"); return 0;

}

1. As a starting point

#include <stdio.h>

#include <stdlib.h>

int main()

{

char title[10][20],author[10][20]; int book\_type[20],shelve[20],loop1; for (loop1=0;loop1<10;loop1++)

{

scanf("%s",&title[loop1]); scanf("%s",&author[loop1]); scanf("%d",&book\_type[loop1]); scanf("%d",&shelve[loop1]);

}

for (loop1=0;loop1<10;loop1++)

{

printf("\n %s %s %d

%d",title[loop1],author[loop1],book\_type[loop1], shelve[loop1]);

}

system("PAUSE"); return 0;

}

Starting point for implementation 2 typedef struct

{

char title[20];

*fill in the rest*

int shelve;

}book;

int main()

{

book lib1[10];; int loop1;

for (loop1=0;loop1<2;loop1++)

{

scanf("%s",&lib1[loop1].title);

*Fill in the rest of the program*

system("PAUSE"); return 0;

}