Engineering Exploration Lab

Activity -1. Simulation of electrical switch

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- **Research**

Referred website - geeksforgeeks(for understanding if-else and else-if loops,nested loop)
Link for coding reference -(for if else loop)https://www.geeksforgeeks.org/c/decision-making-in-c/ &
(For do while loop)https://www.geeksforgeeks.org/c/c-do-while-loop/

Link for starting the car-https://www.ford.com/support/how-tos/keys-and-locks/key-fob-and-remote-start/remote-start-system/
2) https://www.fordservicecontent.com/Ford_Content/vdirsnet/OwnerManual/Home/Content?variantid=4400.&languageCode=en&countryCode=USA&moidRef=G539541&Uid=G1568249&ProcUid=G1568250&userMarket=GBR&div=f&vFilteringEnabled=False&buildtype=web

Visual studio code for c-programming.

Problem statement - **Electrical Switch Simulation to start a automatic Ford:**

Using Remote Start

Remote Starting the Vehicle

The label on your transmitter details the starting procedure.

To remote start your vehicle, first press the lock button to lock all the doors. Then press the remote start button twice. The exterior lamps will flash twice.

Automatic Transmission

Move the transmission selector lever to park.

Fully depress the brake pedal.

Briefly press the start button.

- **Analysing**

  The problem statement is to remote start an automatic Ford car.
  The step by step process is needed to start the car-

  1) Check the key fob's effective range.(90 meters)
     2)Press the lock button on key fob
     3)press the remote start button twice.
     4.check vehicle battery level.

5.Move the transmission selector lever to park.

6.Fully depress the brake pedal.

7.Briefly press the start button.

The **if else if** statements are used when the user has to decide among multiple options. The C if statements are executed from the top down. As soon as one of the conditions controlling the if is true, the statement associated with that if is executed, and the rest of the C else-if ladder is bypassed. If none of the conditions is true, then the final else statement will be executed. if-else-if ladder is similar to the switch statement.

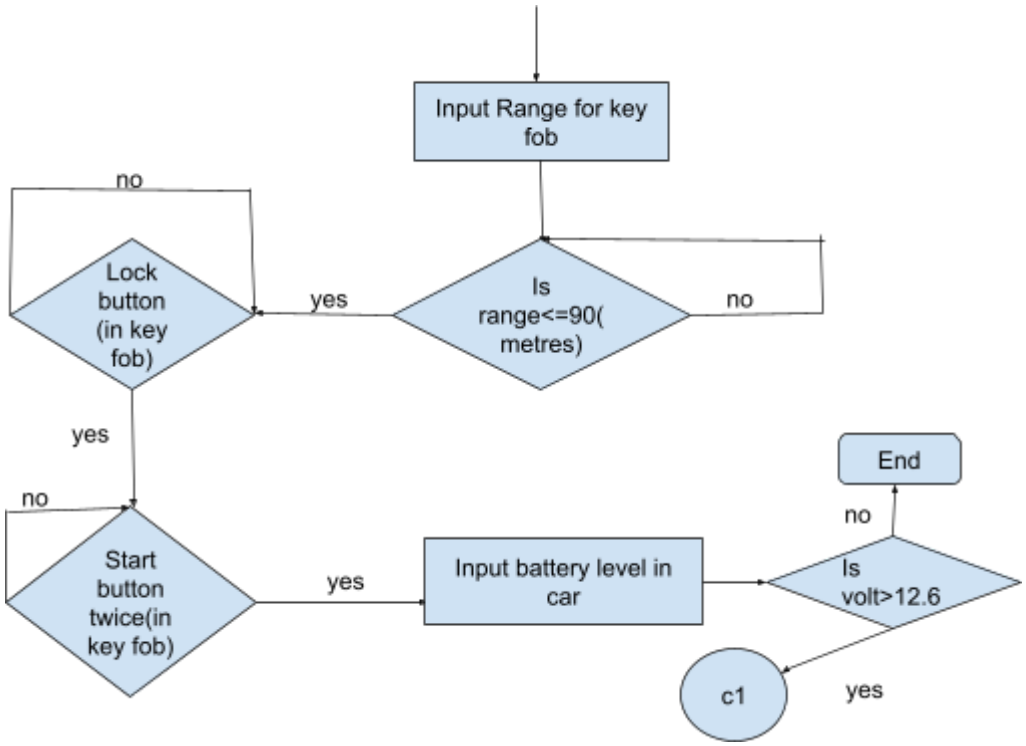
Three conditions-

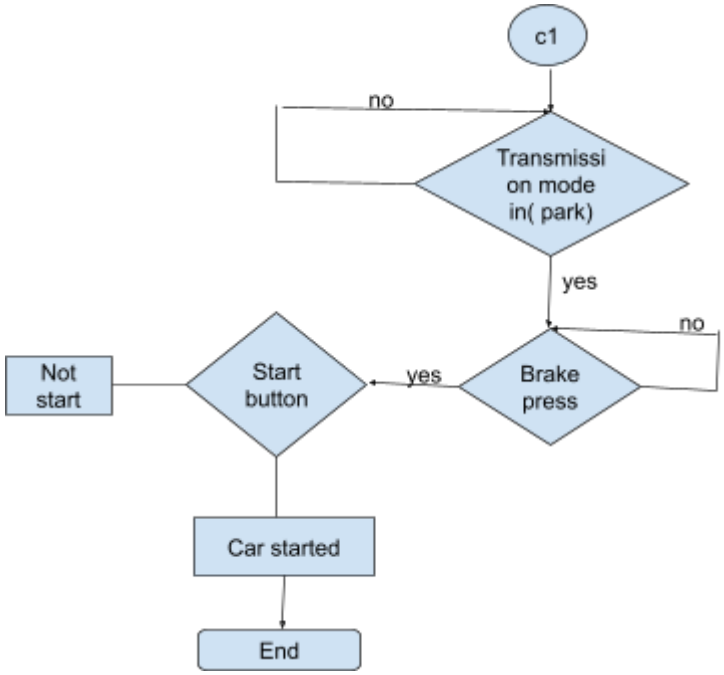
For input 0- the switch is off.
For input 1, output- the switch is on.
For input other that 0,1, output- error(enter valid number).

Do while loop-
Use of do while loop is for making the continuous loop so that the car can start.

- **IDEA**

  Flowchart:





Build:
https://www.programiz.com/online-compiler/9YHhXJyVGteDI

```
#include<stdio.h>
int main (){
   int R,L,S,T,Brake,IB;
   float B;
do{
    printf("Enter the range in metres between the car and the key fob");
    scanf("%d",&R);
    if(R<=90){
       do{
    printf("Enter 1 to on lock button,0 to off lock button");
    scanf("%d",&L);
    if(L==1){
      do{
    printf("to press remote start button twice(enter 1 for on,0 for off) ");
    scanf("%d",&S);
    if(S==1){
    printf("enter the battery voltage in the car");
    scanf("%f",&B);
    if(B>=12.6){
     do{
    printf("Enter 1 to Move the transmission selector lever to park mode or 0 to off the mode ");
```

```
    scanf("%d",&T);
    if(T==1){
    do{
    printf("enter 1 to depress brake pedal, 0 to off(to not to)");
    scanf("%d",&Brake);
    if(Brake==1){
        do{
    printf("enter 1 to press the start button, enter 0 to off");
    scanf("%d",&IB);
    if(IB==1){
       printf("great! you have started the car :)\n");
    }
    else if(IB==0){
      printf("pls enter 1 to start the car\n");
    }
    else{
       printf("pls enter 1 or 0");
    }
}while(IB!=1);
    }
    else if(Brake==0){
      printf("you havent pressed the brake the car didnt started\n");
    }
    else{
       printf("pls enter 1 or 0");
    }
}while(Brake!=1);
    }
    else if(T==0){
```

```
printf("Transmission mode is left from park mode\n");
    }
    else{
       printf("pls enter 1 or 0");

    }
 }while(T!=1);
    }
    else{
       printf("oops your car cant start good luck next time:(");

    }
    }
    else if (S==0)
    {
printf("start button is off,enter 1 to start button twice \n");
    }
    else{
printf("pls enter 1 or 0");

    }
 }while(S!=1);
    }
    else if(L==0){
printf("lock button is off but,pls enter 1 to start the car\n");
    }
    else{
        printf("pls enter 1 or 0");
    }
```

```
 }while(L!=1);
    }
    else{
        printf("the range must be less than 90 meters to use the key
fob\n");
    }
 }while(R>90);
 printf("enter 0 to off the start button ,1 to remain on");
 scanf("%d",&IB);
 if(IB==0){
    printf("the car stopped");
 }

   return 0;
}
```

Testing:

Output-

```
Enter the range in metres between the car and the key fob98
the range must be less than 90 meters to use the key fob
Enter the range in metres between the car and the key fob67
Enter 1 to on lock button,0 to off lock button
0
lock button is off but,pls enter 1 to start the car
Enter 1 to on lock button,0 to off lock button
1
to press remote start button twice(enter 1 for on,0 for off)
0
```

start button is off,enter 1 to start button twice
to press remote start button twice(enter 1 for on,0 for off)
1
enter the battery voltage in the car13.1
Enter 1 to Move the transmission selector lever to park mode or 0 to off the mode
0
Transmission mode is left from park mode
Enter 1 to Move the transmission selector lever to park mode or 0 to off the mode
1
enter 1 to depress brake pedal, 0 to off(to not to)0
you havent pressed the brake the car didnt started
enter 1 to depress brake pedal, 0 to off(to not to)1
enter 1 to press the start button, enter 0 to off0
pls enter 1 to start the car
enter 1 to press the start button, enter 0 to off7
pls enter 1 or 0enter 1 to press the start button, enter 0 to off
0
pls enter 1 to start the car
enter 1 to press the start button, enter 0 to off1
great! you have started the car :)
enter 0 to off the start button ,1 to remain on