```c
/*****************************************************************************/
/*HW05_Furkan_Erdol_131044065_part1.c                                        */
/*_____________________________                                              */
/*Written by Furkan Erdol on March 22, 2015                                  */
/*Description                                                                */
/*____________                                                               */
/*                                                                           */
/*<<<This is a car crash simulation program, for two cars                    */
/*<<<Gives inputs from console and prints the screen car crash simulation    */
/*                                                                           */
/*Inputs:                                                                    */
/*  -Car names                                                               */
/*  -Car speeds                                                              */
/*  -Car weights                                                             */
/*Outputs:                                                                   */
/*  -Prints the screen car crash simulation                                  */
/*                                                                           */
/*...........................................................................*/
/*                              Includes                                     */
/*...........................................................................*/
#include <stdio.h>
#define ROAD_LENGTH 50 /*Define road legnth*/

/*Define enumarated type*/
typedef enum
 {PLAY, CRASH, END}
object_state;

/*Function prototypes*/

/*Calculates crash time. Gives positions and speeds returns crash time*/
double car_crash_time(double position1, double position2, double speed1, double speed2);
/*Two cars collides and move according to inealistic collision. This function *
 *calculate car positions and after collision speed and prints the screen     *
 *simulation.                                                                 *
 *Car names, speeds, positions and game state are input-output parameter      */
void make_move(char *object1, double *position1, double *speed1, int weight1,
               char *object2, double *position2, double *speed2, int weight2, object_state *game_state);
/*Gives car names, positions and game state, prints the screen car crash simulation*/
void print_game_state(char object1, double position1, char object2, double position2, object_state
game_state);


int
main(void)
{

    char object1, object2; /*Car names*/
    double position1=0, position2=ROAD_LENGTH; /*Car positions*/
    double speed1, speed2; /*Car speeds*/
    int weight1, weight2; /*Car weights*/
    int i;
    object_state game_state; /*Game state*/

    /*Input values for car 1*/
    printf("\nEnter name of car 1:");
    scanf(" %c", &object1);
    printf("\nEnter speed of car 1:");
    scanf("%lf", &speed1);
    printf("\nEnter weight of car 1:");
    scanf("%d", &weight1);

    /*Input values for car 2*/
    printf("\nEnter name of car 2:");
    scanf(" %c", &object2);
    printf("\nEnter speed of car 2:");
    scanf("%lf", &speed2);
    printf("\nEnter weight of car 2:");
    scanf("%d", &weight2);

    game_state=PLAY;

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 72      /*Call make move function*/
 73      make_move(&object1,  &position1, &speed1,  weight1, &object2,  &position2, &speed2,  weight2,
     &game_state);
 74
 75
 76
 77      return 0;
 78  }
 79
 80
 81  /*Calculates crash time. Gives positions and speeds returns crash time*/
 82  double car_crash_time(double position1, double position2, double speed1, double speed2)
 83  {
 84
 85      double crash_time; /*Crash time*/
 86
 87      if(speed1>0&&speed2<0)
 88          crash_time=(position2-position1)/(speed1-speed2);
 89      else if(speed1>0&&speed2>0)
 90          crash_time=(position2-position1)/(speed1);
 91      else if(speed1<0&&speed2>0)
 92          crash_time=(position2-position1)/(ROAD_LENGTH);
 93      else if(speed1<0&&speed2<0)
 94          crash_time=(position2-position1)/(-speed2);
 95
 96      return crash_time;
 97  }
 98
 99  /*Two cars collides and move according to inealistic collision. This function *
100   *calculate car positions and after collision speed and prints the screen     *
101   *simulation.                                                                 *
102   *Car names, speeds, positions and game state are input-output parameter      */
103  void make_move(char *object1, double *position1, double *speed1, int weight1,
104                 char *object2, double *position2, double *speed2, int weight2, object_state *game_state)
105
106  {
107      int i;
108      int count=0; /*Counts for crash time*/
109      double crash_time; /*Crash time*/
110      double speed; /*Inelastic collision result, speed*/
111
112      /*Call crash time function and assign it*/
113      crash_time=car_crash_time(*position1, *position2, *speed1, *speed2);
114
115      while(*game_state==PLAY)
116      {
117          /*Call print game state function for prints the screen*/
118          print_game_state(*object1,  *position1,  *object2,  *position2, *game_state);
119
120          /*Change the car positions according to speeds*/
121          *position1+=*speed1;
122          *position2+=*speed2;
123
124          count++;
125
126          /*Change game state when cars collide*/
127          if(count>=crash_time)
128          {
129              *position1-=*speed1;
130              *position2-=*speed2;
131              *game_state=CRASH; /*Update game state*/
132          }
133      }
134
135      /*Calculate new speed after crash according to inealistic collision*/
136      speed=((*speed1*weight1)+(*speed2*weight2))/(weight1+weight2);
137
138      *speed1=speed;/*New speed assign to car 1 speed*/
139      *speed2=speed;/*New speed assign to car 2 speed*/
140
141      /*Assign character 'X' to car names*/
142      *object1='X';
```

```
143      *object2='X';
144
145      while(*game_state==CRASH)
146      {
147          /*Call print game state function for prints the screen*/
148          print_game_state(*object1,  *position1,  *object2,  *position2, *game_state);
149
150          /*Change game state when cars finish their routes*/
151          if(*position1<=0||*position1>=ROAD_LENGTH-1||*position2>ROAD_LENGTH||speed==0)
152              *game_state=END; /*Update game state*/
153
154          *position1+=speed;
155      }
156
157  }
158
159  /*Gives car names, positions and game state, prints the screen car crash simulation*/
160  void print_game_state(char object1, double position1, char object2, double position2, object_state
     game_state)
161  {
162      int i;
163
164      /*Prints the screen before collision*/
165      if(game_state==PLAY)
166      {
167          printf("\n");
168
169          for(i=0;i<position1;i++)
170              printf("_");
171
172          printf("%c", object1);
173
174          if(position1>=0&&position2<=ROAD_LENGTH)
175          {
176              for(i=0;i<(position2-position1)-2; i++)
177                  printf("_");
178          }
179
180          else if(position1<0&&position2<ROAD_LENGTH)
181          {
182              for(i=0;i<position2-2; i++)
183                  printf("_");
184          }
185
186          else if(position1>0&&position2>ROAD_LENGTH)
187          {
188              for(i=0;i<(ROAD_LENGTH-position1)-2; i++)
189                  printf("_");
190          }
191
192          else if(position1<0&&position2>ROAD_LENGTH)
193          {
194              for(i=0;i<ROAD_LENGTH-2; i++)
195                  printf("_");
196          }
197
198          if(position1<ROAD_LENGTH-1)
199          printf("%c", object2);
200
201          for(i=0;i<ROAD_LENGTH-position2;i++)
202              printf("_");
203      }
204
205      /*Prints the screen after collision*/
206      if(game_state==CRASH)
207      {
208          printf("\n");
209
210          for(i=0;i<position1;i++)
211              printf("_");
212
213          printf("%c", object1);
```

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214
215         for(i=0;i<ROAD_LENGTH-position1-1;i++)
216             printf("_");
217     }
218
219     printf("\n12345678901234567890123456789012345678901234567890");
220     printf("\n");
221 }
222
223 /*#############################################################################*/
224 /*                End of HW05_Furkan_Erdol_131044065_part1.c                   */
225 /*#############################################################################*/
```