**B.Program Code**

.model small

.stack

.data

starts db"PC BASED RC CAR CONTROLLING SYSTEM$"

choice1 db "[1] AUTOMATIC$"

choice2 db "[2] MANUAL$"

choice3 db "[3] EXIT$"

choice db "ENTER YOUR CHOICE:$"

manuals db "RC CAR MANUAL CONTROLS$"

msg1 db"[w] FORWARD$"

msg2 db"[q] FORWARD/LEFT$"

msg3 db"[e] FORWARD/RIGHT$"

msg4 db"[s] BACKWARD$"

msg5 db"[a] BACKWARD/LEFT$"

msg6 db"[d] BACKWARD/RIGHT$"

msg8 db"[b] BACK$"

automatic db "AUTOMATIC MODE$"

msg7 db"Car is in automatic mode$"

bg1 db" \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*$"

bg2 db" \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*$"

bg3 db" \*\*\*\*\*\*$"

bg4 db" \*\*\*\*\*\* ################ ################ ################## $"

bg5 db" \*\*\*\*\*\* ################### ################## ################## $"

bg6 db" \*\*\*\*\*\* ###### ###### ###### ###### ###### $"

bg7 db"\*\*\*\*\*\* ###### ###### ##### ########### $"

bg8 db"\*\*\*\*\*\* ###### ################ ########### $"

bg9 db" \*\*\*\*\*\* ###### ###### ###### ###### $"

bg10 db" \*\*\*\*\*\* ################### ###### ################## $"

bg11 db" \*\*\*\*\*\* ############### ###### ################## $"

bg12 db" \*\*\*\*\*\*$"

bg13 db" \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*$"

bg14 db" \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*$"

matik1 db"FORWARDING$"

matik2 db"SENSOR 1 DETECTED AN OBSTACLE$"

matik3 db"SENSOR 2 DETECTED AN OBSTACLE$"

.code

begin:

mov ax,@data

mov ds,ax

mov bh,9eh

call intro

call delay2

mov bh,05eh

call intro

call delay2

mov bh,04eh

call intro

call delay2

mov bh,03eh

call intro

call delay2

startpoint:

call cls

mov ah,02

mov bh,00

mov dl,23

mov dh,07

int 10h

mov ah,09

mov dx,offset starts

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,11

int 10h

mov ah,09

mov dx,offset choice1

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,12

int 10h

mov ah,09

mov dx,offset choice2

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,13

int 10h

mov ah,09

mov dx,offset choice3

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,15

int 10h

mov ah,09

mov dx,offset choice

int 21h

mov ah,01

int 21h

cmp al,'1'

je matik01

cmp al,'2'

je manual

cmp al,'3'

je exit1

jne startpoint

exit1:

call exit

matik01:

call matik

manual:

call cls2

call box

call cls21

mov ah,02

mov bh,00

mov dl,29

mov dh,07

int 10h

mov ah,09h

mov dx,offset manuals

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,11

int 10h

mov ah,09h

mov dx,offset msg1

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,12

int 10h

mov ah,09h

mov dx,offset msg2

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,13

int 10h

mov ah,09h

mov dx,offset msg3

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,14

int 10h

mov ah,09h

mov dx,offset msg4

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,15

int 10h

mov ah,09h

mov dx,offset msg5

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,16

int 10h

mov ah,09

mov dx,offset msg6

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,17

int 10h

mov ah,09

mov dx,offset msg8

int 21h

input :

mov dx,378h

mov al,00000000h

out dx,al

mov ah,02

mov bh,00

mov dl,0

mov dh,24

int 10h

mov ah,07

int 21h

cmp al,'w'

je forward

cmp al,'q'

je forwardleft

cmp al,'e'

je forwardright

cmp al,'a'

je backwardleft

cmp al,'s'

je backward

cmp al,'d'

je backwardright

cmp al,'b'

je back

cmp al,'W'

je forward

cmp al,'Q'

je forwardleft

cmp al,'E'

je forwardright

cmp al,'A'

je backwardleft

cmp al,'S'

je backward

cmp al,'D'

je backwardright

cmp al,'B'

je back

jne input

back:

call startpoint

forward:

mov dx,378h

mov al,00000001b

out dx,al

call delay

call input

forwardleft:

mov dx,378h

mov al,00001001b

out dx,al

call delay

call input

forwardright:

mov dx,378h

mov al,00000101b

out dx,al

call delay

call input

backward:

mov dx,378h

mov al,00000010b

out dx,al

call delay

call input

backwardleft:

mov dx,378h

mov al,00001010b

out dx,al

call delay

call input

backwardright:

mov dx,378h

mov al,00000110b

out dx,al

call delay

call input

matik:

call cls

call box

call cls12

mov ah,02

mov bh,00

mov dl,33

mov dh,07

int 10h

mov ah,09

mov dx,offset automatic

int 21h

mov ah,02

mov bh,00

mov dl,29

mov dh,11

int 10h

mov ah,09

mov dx,offset msg7

int 21h

read:

mov ah,02

mov bh,00

mov dh,24

mov dl,00

int 10h

mov dx,379h

in al,dx

test al, 00001000b

je sensor1

test al, 00010000b

je sensor2

jnz forwarding

sensor1:

call sensor11

sensor2:

call sensor22

forwarding:

mov ah,02

mov bh,00

mov dl,36

mov dh,14

int 10h

mov ah,09

mov dx,offset matik1

int 21h

mov dx,378h

call delay

call delay

call delay

mov al,00000001b

out dx,al

call delay

call delay

call delay

call delay

call delay

call delay

mov al,00000000b

out dx,al

call delay

call delay

call delay

call delay

call delay

call delay

jmp read1

sensor11:

mov ah,02

mov bh,00

mov dl,36

mov dh,14

int 10h

mov ah,09

mov dx,offset matik2

int 21h

mov dx,378h

mov al,00000010b

out dx,al

call delay

mov al,00000010b

out dx,al

call delay

mov al,00000010b

out dx,al

call delay

mov al,00001010b

out dx,al

call delay

mov al,00001010b

out dx,al

call delay

jmp read1

read1:

call read

sensor22:

mov ah,02

mov bh,00

mov dl,36

mov dh,14

int 10h

mov ah,09

mov dx,offset matik3

int 21h

mov dx,378h

mov al,00000010b

out dx,al

call delay

mov al,00000010b

out dx,al

call delay

mov al,00000010b

out dx,al

call delay

mov al,00000110b

out dx,al

call delay

mov al,00000110b

out dx,al

call delay

jmp read1

cls proc

mov ah,06

mov bh,22h

mov cx,0000

mov dh,00

mov dl,10

int 10h

mov bh,77h

mov cl,10

mov ch,0

mov dh,00

mov dl,20

int 10h

mov bh,22h

mov cl,20

mov ch,0

mov dh,00

mov dl,30

int 10h

mov bh,77h

mov cl,30

mov ch,0

mov dh,00

mov dl,40

int 10h

mov bh,22h

mov cl,40

mov ch,0

mov dh,00

mov dl,50

int 10h

mov bh,77h

mov cl,50

mov ch,0

mov dh,00

mov dl,60

int 10h

mov bh,22h

mov cl,60

mov ch,0

mov dh,00

mov dl,70

int 10h

mov bh,77h

mov cl,70

mov ch,0

mov dh,00

mov dl,80

int 10h

mov bh,77h

mov cl,00

mov ch,04

mov dh,00

mov dl,10

int 10h

mov bh,22h

mov cl,10

mov ch,04

mov dh,00

mov dl,20

int 10h

mov bh,77h

mov cl,20

mov ch,04

mov dh,00

mov dl,30

int 10h

mov bh,22h

mov cl,30

mov ch,04

mov dh,00

mov dl,40

int 10h

mov bh,77h

mov cl,40

mov ch,04

mov dh,00

mov dl,50

int 10h

mov bh,22h

mov cl,50

mov ch,04

mov dh,00

mov dl,60

int 10h

mov bh,77h

mov cl,60

mov ch,04

mov dh,00

mov dl,70

int 10h

mov bh,22h

mov cl,70

mov ch,04

mov dh,00

mov dl,80

int 10h

mov bh,22h

mov cl,00

mov ch,08

mov dh,00

mov dl,10

int 10h

mov bh,77h

mov cl,10

mov ch,08

mov dh,00

mov dl,20

int 10h

mov bh,22h

mov cl,20

mov ch,08

mov dh,00

mov dl,30

int 10h

mov bh,77h

mov cl,30

mov ch,08

mov dh,00

mov dl,40

int 10h

mov bh,22h

mov cl,40

mov ch,08

mov dh,00

mov dl,50

int 10h

mov bh,77h

mov cl,50

mov ch,08

mov dh,00

mov dl,60

int 10h

mov bh,22h

mov cl,60

mov ch,08

mov dh,00

mov dl,70

int 10h

mov bh,77h

mov cl,70

mov ch,08

mov dh,00

mov dl,80

int 10h

mov bh,77h

mov cl,00

mov ch,12

mov dh,00

mov dl,10

int 10h

mov bh,22h

mov cl,10

mov ch,12

mov dh,00

mov dl,20

int 10h

mov bh,77h

mov cl,20

mov ch,12

mov dh,00

mov dl,30

int 10h

mov bh,22h

mov cl,30

mov ch,12

mov dh,00

mov dl,40

int 10h

mov bh,77h

mov cl,40

mov ch,12

mov dh,00

mov dl,50

int 10h

mov bh,22h

mov cl,50

mov ch,12

mov dh,00

mov dl,60

int 10h

mov bh,77h

mov cl,60

mov ch,12

mov dh,00

mov dl,70

int 10h

mov bh,22h

mov cl,70

mov ch,12

mov dh,00

mov dl,80

int 10h

mov bh,22h

mov cl,00

mov ch,16

mov dh,00

mov dl,10

int 10h

mov bh,77h

mov cl,10

mov ch,16

mov dh,00

mov dl,20

int 10h

mov bh,22h

mov cl,20

mov ch,16

mov dh,00

mov dl,30

int 10h

mov bh,77h

mov cl,30

mov ch,16

mov dh,00

mov dl,40

int 10h

mov bh,22h

mov cl,40

mov ch,16

mov dh,00

mov dl,50

int 10h

mov bh,77h

mov cl,50

mov ch,16

mov dh,00

mov dl,60

int 10h

mov bh,22h

mov cl,60

mov ch,16

mov dh,00

mov dl,70

int 10h

mov bh,77h

mov cl,70

mov ch,16

mov dh,00

mov dl,80

int 10h

cls endp

box proc

mov ah,06

mov bh,90h

mov cl,20

mov ch,4

mov dx,033bh

int 10h

mov bh,0eh

mov cl,21

mov ch,5

mov dl,3ah

mov dh,02

int 10h

mov bh,90h

mov cl,20

mov ch,9

mov dx,033bh

int 10h

mov bh,0eh

mov cl,21

mov ch,10

mov dl,3ah

mov dh,02

int 10h

mov bh,90h

mov cl,20

mov ch,20

mov dx,033bh

int 10h

box endp

cls12 proc

mov ah,06

mov bh,77h

mov cl,00

mov ch,21

mov dh,00

mov dl,10

int 10h

mov bh,22h

mov cl,10

mov ch,21

mov dh,00

mov dl,20

int 10h

mov bh,77h

mov cl,20

mov ch,21

mov dh,00

mov dl,30

int 10h

mov bh,22h

mov cl,30

mov ch,21

mov dh,00

mov dl,40

int 10h

mov bh,77h

mov cl,40

mov ch,21

mov dh,00

mov dl,50

int 10h

mov bh,22h

mov cl,50

mov ch,21

mov dh,00

mov dl,60

int 10h

mov bh,77h

mov cl,60

mov ch,21

mov dh,00

mov dl,70

int 10h

mov bh,21h

mov cl,70

mov ch,21

mov dh,00

mov dl,80

int 10h

ret

cls12 endp

cls2 proc

mov ah,06

mov bh,49h

mov cl,00

mov ch,00

mov dh,00

mov dl,10

int 10h

mov bh,79h

mov cl,10

mov ch,0

mov dh,00

mov dl,20

int 10h

mov bh,49h

mov cl,20

mov ch,0

mov dh,00

mov dl,30

int 10h

mov bh,79h

mov cl,30

mov ch,0

mov dh,00

mov dl,40

int 10h

mov bh,49h

mov cl,40

mov ch,0

mov dh,00

mov dl,50

int 10h

mov bh,79h

mov cl,50

mov ch,0

mov dh,00

mov dl,60

int 10h

mov bh,49h

mov cl,60

mov ch,0

mov dh,00

mov dl,70

int 10h

mov bh,79h

mov cl,70

mov ch,0

mov dh,00

mov dl,80

int 10h

mov bh,79h

mov cl,00

mov ch,04

mov dh,00

mov dl,10

int 10h

mov bh,49h

mov cl,10

mov ch,04

mov dh,00

mov dl,20

int 10h

mov bh,79h

mov cl,20

mov ch,04

mov dh,00

mov dl,30

int 10h

mov bh,49h

mov cl,30

mov ch,04

mov dh,00

mov dl,40

int 10h

mov bh,79h

mov cl,40

mov ch,04

mov dh,00

mov dl,50

int 10h

mov bh,49h

mov cl,50

mov ch,04

mov dh,00

mov dl,60

int 10h

mov bh,79h

mov cl,60

mov ch,04

mov dh,00

mov dl,70

int 10h

mov bh,49h

mov cl,70

mov ch,04

mov dh,00

mov dl,80

int 10h

mov bh,49h

mov cl,00

mov ch,08

mov dh,00

mov dl,10

int 10h

mov bh,79h

mov cl,10

mov ch,08

mov dh,00

mov dl,20

int 10h

mov bh,49h

mov cl,20

mov ch,08

mov dh,00

mov dl,30

int 10h

mov bh,79h

mov cl,30

mov ch,08

mov dh,00

mov dl,40

int 10h

mov bh,49h

mov cl,40

mov ch,08

mov dh,00

mov dl,50

int 10h

mov bh,79h

mov cl,50

mov ch,08

mov dh,00

mov dl,60

int 10h

mov bh,49h

mov cl,60

mov ch,08

mov dh,00

mov dl,70

int 10h

mov bh,79h

mov cl,70

mov ch,08

mov dh,00

mov dl,80

int 10h

mov bh,79h

mov cl,00

mov ch,12

mov dh,00

mov dl,10

int 10h

mov bh,49h

mov cl,10

mov ch,12

mov dh,00

mov dl,20

int 10h

mov bh,79h

mov cl,20

mov ch,12

mov dh,00

mov dl,30

int 10h

mov bh,49h

mov cl,30

mov ch,12

mov dh,00

mov dl,40

int 10h

mov bh,79h

mov cl,40

mov ch,12

mov dh,00

mov dl,50

int 10h

mov bh,49h

mov cl,50

mov ch,12

mov dh,00

mov dl,60

int 10h

mov bh,79h

mov cl,60

mov ch,12

mov dh,00

mov dl,70

int 10h

mov bh,49h

mov cl,70

mov ch,12

mov dh,00

mov dl,80

int 10h

mov bh,49h

mov cl,00

mov ch,16

mov dh,00

mov dl,10

int 10h

mov bh,79h

mov cl,10

mov ch,16

mov dh,00

mov dl,20

int 10h

mov bh,49h

mov cl,20

mov ch,16

mov dh,00

mov dl,30

int 10h

mov bh,79h

mov cl,30

mov ch,16

mov dh,00

mov dl,40

int 10h

mov bh,49h

mov cl,40

mov ch,16

mov dh,00

mov dl,50

int 10h

mov bh,79h

mov cl,50

mov ch,16

mov dh,00

mov dl,60

int 10h

mov bh,49h

mov cl,60

mov ch,16

mov dh,00

mov dl,70

int 10h

mov bh,79h

mov cl,70

mov ch,16

mov dh,00

mov dl,80

int 10h

cls2 endp

cls21 proc

mov ah,06

mov bh,79h

mov cl,00

mov ch,21

mov dh,00

mov dl,10

int 10h

mov bh,49h

mov cl,10

mov ch,21

mov dh,00

mov dl,20

int 10h

mov bh,79h

mov cl,20

mov ch,21

mov dh,00

mov dl,30

int 10h

mov bh,49h

mov cl,30

mov ch,21

mov dh,00

mov dl,40

int 10h

mov bh,79h

mov cl,40

mov ch,21

mov dh,00

mov dl,50

int 10h

mov bh,49h

mov cl,50

mov ch,21

mov dh,00

mov dl,60

int 10h

mov bh,79h

mov cl,60

mov ch,21

mov dh,00

mov dl,70

int 10h

mov bh,49h

mov cl,70

mov ch,21

mov dh,00

mov dl,80

int 10h

ret

cls21 endp

intro proc

mov ah,06

mov dx,184fh

mov cx,0

int 10h

mov ah,02

mov bh,00

mov dl,01

mov dh,05

int 10h

mov ah,09h

mov dx,offset bg1

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,06

int 10h

mov ah,09h

mov dx,offset bg2

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,07

int 10h

mov ah,09h

mov dx,offset bg3

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,08

int 10h

mov ah,09h

mov dx,offset bg4

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,09

int 10h

mov ah,09h

mov dx,offset bg5

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,10

int 10h

mov ah,09h

mov dx,offset bg6

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,11

int 10h

mov ah,09h

mov dx,offset bg7

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,12

int 10h

mov ah,09h

mov dx,offset bg8

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,13

int 10h

mov ah,09h

mov dx,offset bg9

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,14

int 10h

mov ah,09h

mov dx,offset bg10

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,15

int 10h

mov ah,09h

mov dx,offset bg11

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,16

int 10h

mov ah,09h

mov dx,offset bg12

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,17

int 10h

mov ah,09h

mov dx,offset bg13

int 21h

mov ah,02

mov bh,00

mov dl,01

mov dh,18

int 10h

mov ah,09h

mov dx,offset bg14

int 21h

intro endp

delay:

push bx

push cx

mov bx, 4500

B:

mov cx, 8000

C:

NOP

Loop C

dec bx

jnz B

pop cx

pop bx

ret

delay2:

push bx

push cx

mov bx, 18000

D:

mov cx, 30000

E:

NOP

Loop E

dec bx

jnz D

pop cx

pop bx

ret

exit:

mov ah,4ch

int 21h

end begin