Answer ALL the questions. (Topic: Jumping Statement and Multiple Selection)

1. Implement the following decision table using i**f…else** Ladderstatement. Assume that the wind speed is given by the user in miles per hour. Use **#define** preprocessor directive to give meaningful name to significant constant. (1 mile = 1.60934 km).

|  |  |  |
| --- | --- | --- |
| Category | Wind Speed | Potential Damages |
| One | 119–153 km/h | Moderate damage. Roofs severely stripped. |
| Two | 154–177 km/h | Considerable damage. Roofs torn off. |
| Three | 178–208 km/h | Severe damage to houses and large buildings. |
| Four | 209–251 km/h | Extreme damage. Whole frame houses completely leveled. |
| Five | ≥252 km/h | Total Destruction. Tall buildings collapse. |

Is it possible to build the program using the Switch case statement?

#include <stdio.h>

#define mile 1.60934

int main()

{

float speed,wspeed;

printf("Enter wind speed: \n");

scanf("%f",&speed);

wspeed=speed\*mile;

printf("Wind speed in km/h: %.2f",wspeed);

if (wspeed>=119 && wspeed<=153){

printf("\nCategory One\n");

printf("Potential damage:Moderate damage. Roofs severely stripped.");

}

else if (wspeed>=154 && wspeed<=177){

printf("\nCategory Two\n");

printf("Potential damage: Considerable damage. Roofs torn off.");

}

else if (wspeed>=178 && wspeed<=208){

printf("\nCategory Three\n");

printf("Potential damage: Severe damage to houses and large buildings.");

}

else if (wspeed>=209 && wspeed<=251){

printf("\nCategory Four\n");

printf("Potential damage: Extreme damage. Whole frame houses completely leveled.");

}

else if (wspeed>=252){

printf("\nCategory Five\n");

printf("Potential damage: Total Destruction. Tall buildings collapse.");

}

else {

printf("\nNo damage\n");

}

return 0;

}

No bcs‘if…else’ statement is more suitable to use for data in ranges compared to ‘switch case’ statement.

Yes, switch is more complicated.

Sir’s answer:

#include<stdio.h>

#define mile1 1.60934

int main (void)

{

float wind,mile;

printf("Enter the wind speed (mile per hour):");

scanf("%f",&mile);

printf("\n");

wind=mile\*mile1;

if (wind>=119&&wind<=153){

printf("Moderate damage. Roofs severely stripped.\n");

printf("~~~~~~~~~~~\n");}

else if (wind>=154&&wind<=177){

printf("Considerable damage. Roofs torn off.\n");

printf("~~~~~~~~~~~\n");}

else if (wind>=178&&wind<=208){

printf("Severe damage to houses and large buildings.\n");

printf("~~~~~~~~~~~~~\n");}

else if (wind>=209&&wind<=251){

printf("Extreme damage. Whole frame houses completely leveled.\n");

printf("~~~~~~~~~~~~~~~~\n");}

else if (wind>=252){

printf("Total Destruction. Tall buildings collapse.\n");

printf("~~~~~~~~~~~~n");}

else {

printf("INVALID VALUE.\n");

printf("~~~~~~\n");}

return 0;

}

1. Write a program that reports the contents of a compressed-gas cylinder based on the first letter of the cylinder’s colour. The program input is a character representing the observed colour of the cylinder: ‘R’ or ‘r’ for Red, ‘G’ or ‘g’ for grey and so on. Cylinder colours and associated contents are as follows:

Red ammonia

Blue carbon monoxide Grey hydrogen

White oxygen

Your program should respond to input of a letter other than the first letters of the given colours with the message, Contents unknown.

[Build 2 different programs using a) Switch case and b) if…else Ladder]

Must put break for switch statement

(a)

#include <stdio.h>

int main()

{

char color;

printf("Enter the first letter of cylinder color:\n");

scanf("%c",&color);

switch(color)

{

case 'R':

case 'r': printf("The content is ammonia\n");

break;

case 'G':

case 'g': printf("The content is hydrogen\n");

break;

case 'B':

case 'b': printf("The content is carbon monoxide\n");

break;

case 'W':

case 'w': printf("The content is oxygen\n");

break;

default: printf("The content is unknown\n");

break;

}

return 0;

}

Sir’s answer:

#include <stdio.h>

int main()

{

char color;

printf("Contents of compressed-gas cylinder\n");

printf("~~~~~~~~~~~\n");

printf(" Type colour code:\n");

printf(" R / r for Red \n");

printf(" B / b for Blue \n");

printf(" G / g for Grey \n");

printf(" W / w for White \n");

printf("\n Colour >>>>:");

scanf("%c", &color);

switch(color)

{

case 'R':

case 'r':printf("\n\t----------------\n");

printf("\tContents Ammonia");

printf("\n\t----------------\n");

break;

case 'B':

case 'b':printf("\n\t------------------------\n");

printf("\tContents Carbon Monoxide");

printf("\n\t------------------------\n");

break;

case 'G':

case 'g':printf("\n\t-----------------\n");

printf("\tContents Hydrogen");

printf("\n\t-----------------\n");

break;

case 'W':

case 'w':printf("\n\t---------------\n");

printf("\tContents Oxygen");

printf("\n\t---------------\n");

break;

default:printf("\n\t----------------\n");

printf("\tContents Unknown");

printf("\n\t----------------\n");

}

return 0;

}

(b)

#include <stdio.h>

int main()

{

char color,r,R,b,B,g,G,w,W;

printf("The cylinder color is \n");

scanf("%c",&color);

if(color=='r' || color=='R'){

printf("Red >>");

printf(" The content is ammonia");

}

else if(color=='b' || color=='B'){

printf("Blue >>");

printf(" The content is carbon monoxide");

}

else if(color=='g' || color=='G'){

printf("Grey >>");

printf(" The content is hydrogen");

}

else if(color=='w' || color=='W'){

printf("White >>");

printf(" The content is oxygen");

}

else{

printf("error.");

}

return 0;

}

Sir’s answer:

#include <stdio.h>

int main()

{

char color;

printf("Contents of compressed-gas cylinder\n");

printf("~~~~~~~~~~~\n");

printf(" Type colour code:\n");

printf(" R / r for Red \n");

printf(" B / b for Blue \n");

printf(" G / g for Grey \n");

printf(" W / w for White \n");

printf("\n Colour >>>>:");

scanf("%c", &color);

if(color=='R'||color=='r')

{printf("\n\t----------------\n");

printf("\tContents Ammonia");

printf("\n\t----------------\n");}

else if(color=='B'||color=='b')

{printf("\n\t----------------\n");

printf("\tContents Carbon Monoxide");

printf("\n\t----------------\n");}

else if(color=='G'||color=='g')

{printf("\n\t----------------\n");

printf("\tContents Hydrogen");

printf("\n\t----------------\n");}

else if(color=='W'||color=='w')

{printf("\n\t----------------\n");

printf("\tContents Oxygen");

printf("\n\t----------------\n");}

else

{printf("\n\t----------------\n");

printf("\tContents Unknown");

printf("\n\t----------------\n");}

return 0;

}

1. Based on Question 1 and 2, what are the similarities and differences between if…else Ladder and switch case.

<https://www.codewithc.com/difference-between-switch-case-and-else-if-ladder/#:~:text=Each%20case%20in%20switch%20statement,%2Fnon%2Dzero)%20basis>.

1. Write C program that allows user to choose the number of drink cans and make selections on type of drinks [example🡪Type 1:Coke 2:Sprite 3:Pepsi] based on the flowchart below: (please use goto statement for looping part and switch case statement for the selection)

Declare

n=1, choice, numcan

Print

“Enter the number of drink can”

Read

numcan

Print

“Thank you for your purchases. Please buy again.”

n<=numcan

FALSE

TRUE

choice=1

Print

“You have selected Coke”

TRUE

choice=2

Print

“You have selected Sprite” “Plus

FALSE

TRUE

n++

FALSE

Print

“You have selected Pepsi”

choice=3

TRUE

FALSE

Print

“Wrong selection. No refund is given.”

TRUE

Defaults

FALSE

#include<stdio.h>

int main()

{

int n=1, numcan, choice;

printf("Please Enter The Number of Cans You Want\n");

scanf("%d", &numcan);

LOOP:

printf("Please Select The Type of Drinks You Want\n");

scanf("%d", &choice);

switch(choice)

{

case 1: printf("You Have Selected Iced Coffee\n\n");

break;

case 2: printf("You Have Selected Iced Milo\n\n");

break;

case 3: printf("You Have Selected Iced Tea\n\n");

break;

default: printf("Wrong Selection. No Refund Is Given\n\n");

break;

}

n++;

if(n<=numcan)

{

goto LOOP;

}

else

{

printf("Thank You For Your Purchase. Please Buy Again.\n");

}

return 0;

}

Sir’s answer:

#include<stdio.h>

int main()

{

int n,numcan,choice;

printf("Enter the number of drink can that you would like to buy:");

scanf("%d",&numcan);

printf("Type 1:Coke 2:100 Plus 3:Iced Lemon Tea\n");

n=1;

Loop:

{

printf("\nPlease enter your no. %d choice:",n);

scanf("%d",&choice);

switch(choice)

{

case 1:printf("\tYou have selected Coke\n");

break;

case 2:printf("\tYou have selected 100 Plus\n");

break;

case 3:printf("\tYou have selected Iced Lemon Tea\n");

break;

default:printf("\tWrong selection. No refund is given.\n");

}

}

n++;

if (n<=numcan)

goto Loop;

printf("\nThank you for your purchases. Please buy again.");

return 0;

}

1. Write a C program to calculate the parking fare for customers who park their vehicles in a parking lot. The management uses two different rates for each type of vehicle, as shown below:

|  |  |  |  |
| --- | --- | --- | --- |
| Vehicle | Class | First Rate | Second Rate |
| Car | 1 | $1.00/hour first 3 hour | $1.50/hour after 3 hours |
| Truck | 2 | $2.00/hour first 2 hour | $2.50/hour after 2 hours |
| Bus | 3 | $2.50/hour for first hour | $3.70/hour after first hours |

The program must prompt the user to enter the following information as below.

* 1. The type of vehicle within its class.
  2. An integer between 0 and 24 showing the hour the vehicle entered the parking lot.
  3. An integer between 0 and 60 showing the minute the vehicle entered the parking lot.
  4. An integer between 0 and 24 showing the hour the vehicle left the parking lot.
  5. An integer between 0 and 60 showing the minute the vehicle left the parking lot.

To calculate the time spent in the parking lot, use the following algorithm.

1. Compare the minute portion of the leaving and entering time. If the first one is smaller than the second,

(i.i) Add 60 to the minute portion of the leaving time. (i.ii) Subtract 1 from the hour portion of the leaving time.

1. Subtract the hour potion.
2. Subtract the minute portion.
3. Since there are no fractional hour charges, the program must also round the parking time up to the next hour before calculating the charge. The program should use the **switch** statement to distinguish between the different types of vehicles.

The sample output files are shown below.

Enter the class of vehicle? 1

|  |  |  |
| --- | --- | --- |
| Hour vehicle entered lot | (0 - 24)? | 14 |
| Minute vehicle entered lot | (0 - 60)? | 23 |
| Hour vehicle left lot | (0 - 24)? | 18 |
| Minute vehicle left lot  Class of vehicle : 1 | (0 - 60)? | 8 |

TIME-IN 14 : 23

TIME-OUT 18 : 8

-------- PARKING TIME 3 : 45

ROUNDED PARKING TIME 4 hours TOTAL CHARGES RM4.50

Solution:

#include <stdio.h>

int main()

{

int class,hour1,hour2,min1,min2,hour,min,rounded;

float charges;

printf("Enter the class of vehicle? ");

scanf("%d",&class);

printf("Hour vehicle entered lot (0 - 24)? ");

scanf("%d",&hour1);

printf("Minute vehicle entered lot (0 - 60)? ");

scanf("%d",&min1);

printf("Hour vehicle left lot (0 - 24)? ");

scanf("%d",&hour2);

printf("Minute vehicle left lot (0 - 60)? ");

scanf("%d",&min2);

printf("Class of vehicle : %d",class);

printf("\nTIME-IN %d : %d",hour1,min1);

printf("\nTIME-OUT %d : %d",hour2,min2);

printf("\n --------");

if(min2<min1){

min2=min2+60;

hour2=hour2-1;

hour=hour2-hour1;

min=min2-min1;

if(min>30)

rounded=hour+1;

else

rounded=hour;

printf("\nPARKING TIME %d : %d\n",hour,min);

printf("ROUNDED PARKING TIME %d hours\n",rounded);

}

switch(class)

{

case 1:

if (rounded<=3)

charges=rounded\*1;

else

charges=(rounded-3)\*1.5+3;

break;

case 2:

if (rounded<=2)

charges=rounded\*2;

else

charges=(rounded-2)\*2.5+4;

break;

case 3:

if (rounded<=1)

charges=rounded\*2.5;

else

charges=(rounded-1)\*3.7+2.5;

break;

}

printf("TOTAL CHARGES $%.2f",charges);

return 0;

}

Sir’s answer:

#include <stdio.h>

int main()

{

int clas,Henter, Menter, Hleft, Mleft, Hour, Minute, firstHour, BHour;

float rate1, rate2, Total, Total1, Total2;

printf("~~~~~~~~~\n");

printf("Enter the class of vehicle:");

scanf("%d",&clas);

printf("Hour vehicle entered lot (0-24):");

scanf("%d",&Henter);

printf("Minute vehicle entered lot (0-60):");

scanf("%d",&Menter);

printf("Hour vehicle left lot (0-24):");

scanf("%d",&Hleft);

printf("Minute vehicle left lot (0-60):");

scanf("%d",&Mleft);

printf("~~~~~~~~~\n\n");

switch(clas)

{

case 1: rate1=1;

rate2=1.5;

firstHour=3;

break;

case 2: rate1=2;

rate2=2.5;

firstHour=2;

break;

case 3: rate1=2.5;

rate2=3.7;

firstHour=1;

break;

}

printf("Class of vehicle:%d\n", clas);

printf("TIME-IN %d:%d\n", Henter,Menter);

printf("TIME-OUT %d:%d\n", Hleft,Mleft);

printf(" ---------\n");

if (Mleft<Menter)

{

Mleft=Mleft+60;

Hleft=Hleft-1;

}

Hour=Hleft-Henter;

Minute=Mleft-Menter;

printf("PARKING TIME %d:%d\n", Hour,Minute);

printf(" ---------\n\n");

if (Minute>30)

{

Hour=Hour+1;

Minute=0;

}

if (Hour<firstHour)

Total=rate1\*Hour;

else

{

BHour=Hour-firstHour;

Total1=rate1\*firstHour;

Total2=rate2\*BHour;

Total=Total1+Total2;

}

printf("ROUNDED PARKING TIME %d HOURS.\n",Hour);

printf("TOTAL CHARGES RM%.2f\n",Total);

printf("~~~~~~~~~~~~~~\n\n");

return 0;

}

1. Write C Program to calculate the sum and average of 10 integer positive numbers. If the user enters number as a negative number, a program will automatically skip from the calculation, then the program will display sum and average.

#include <stdio.h>

int main()

{

int num,i,sum=0;

float average;

for(i=1;i<=10;i++)

{

printf("Enter number: ");

scanf("%d",&num);

if(num<0)

break;

sum=sum+num;

average=sum/i;

}

printf("Sum is %d\n",sum);

printf("Average is %.2f",average);

return 0;

}

Sir’s answer:

#include <stdio.h>

int main()

{

const int maxInput = 10;

int i, number;

float average, sum=0.0;

for(i=1; i<=maxInput; ++i)

{

printf("%d. Enter a number: ", i);

scanf("%d",&number);

if(number<0)

continue;

sum += number;

}

average=sum/(maxInput);

printf("Sum = %.2f\n", sum);

printf("Average = %.2f", average);

return 0;

}

1. Write program C to print the number and sum of even numbers from 1 to 100 without using the LOOP statement.

#include <stdio.h>

int main()

{

int i,sum=0;

loop:

i+=2;

printf("%d\t",i);

sum+=i;

if(i<100)

goto loop;

printf("\nSum = %d",sum);

return 0;

}

Sir’s answer:

#include <stdio.h>

int main()

{

int number, sum=0;

number=2;

repeat:

printf("%d\n or t",number);

number=number+2;

sum=sum+number;

if(number<=100)

goto repeat;

printf("Sum of even number above is = %d\n",sum);

return 0;

}