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| 1. Write a program that calculates that how many digits a number contains:   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int number, digits;  6  7 printf("Enter a number: ");  8 scanf("%d", &number);  9  10 if ( (number >= 0) && (number <= 9) )  11 digits = 1;  12 else if ( (number >= 10) && (number <= 99) )  13 digits = 2;  14 else if ( (number >= 100) && (number <= 999) )  15 digits = 3;  16 else if ( (number >= 1000) && (number <= 9999) )  17 digits = 4;  18 else  19 digits = -1;  20  21 printf("The number %d has %d digits \n", number, digits);  22  23 return 0;  24 } |
| 1. Write a program that asks the user for a 24-hour time, then displays the time in 12-hour form:   1 #include <stdio.h>  2 #include <stdbool.h>  3  4 int main(void)  5 {  6 int hour, minute;  7 bool isPM;  8  9 printf("Enter a 24-hour time: ");  10 scanf("%d:%d", &hour, &minute);  11  12 isPM = (hour >= 12);  13 hour = hour - isPM \* 12;  14  15 printf("Equivalent 12-hour time: %d:%.2d %s \n",  16 hour, minute, ((isPM) ? ("PM") : ("AM")) );  17  18 return 0;  19 } |
| 1. Modify the broker.c program of Section 5.2 by making both of the following changes:   1 #include <stdio.h>  2  3 int main(void)  4 {  5 float share, price\_per\_share;  6 float value;  7 float rival\_commission;  8 float origin\_commission;  9  10 printf("Enter the share and price per share: ");  11 scanf("%f %f", &share, &price\_per\_share);  12  13 value = share \* price\_per\_share;  14  15 if (value < 2000.0f) {  16 rival\_commission = 33.0f + value \* 0.03f;  17 } else {  18 rival\_commission = 33.0f + value \* 0.02f;  19 }  20  21 if (value < 2500.0f) {  22 origin\_commission = 30.0f + 0.017f \* value;  23 } else if (value < 6250.0f) {  24 origin\_commission = 56.0f + 0.0066f \* value;  25 } else if (value < 20000.0f) {  26 origin\_commission = 76.0f + 0.0034f \* value;  27 } else if (value < 50000.0f) {  28 origin\_commission = 100.0f + 0.0022f \* value;  29 } else if (value < 500000.0f) {  30 origin\_commission = 155.0f + 0.0011f \* value;  31 } else {  32 origin\_commission = 255.0f + 0.0009f \* value;  33 }  34  35 if (origin\_commission < 39.0f)  36 origin\_commission = 39.0f;  37  38 printf("original commision : %.2f \n", origin\_commission);  39 printf("rival broker's commision: %.2f \n", rival\_commission );  40  41 return 0;  42 } |
| 1. Write a program that asks the user to enter a wind speed (in knots), then displays the corresponding description.   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int wind\_speed;  6  7 printf("wind speed: ");  8 scanf("%d", &wind\_speed);  9  10 if (wind\_speed < 1)  11 printf("Calm \n");  12 else if (wind\_speed < 3)  13 printf("Light air \n");  14 else if (wind\_speed < 27)  15 printf("Breeze");  16 else if (wind\_speed < 47)  17 printf("Gale \n");  18 else if (wind\_speed < 63)  19 printf("Storm \n");  20 else  21 printf("Hurricane \n");  22  23 return 0;  24 } |
| 1. Write a program that asks the user to enter the amount of taxable income, then displays the tax due.   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int income;  6 float tax;  7  8 printf("Income: ");  9 scanf("%d", &income);  10  11 if (income < 750)  12 tax = income \* 0.01f;  13 else if (income < 2250)  14 tax = 7.5f + (income - 750.0f) \* 0.02f;  15 else if (income < 3750)  16 tax = 37.5f + (income - 2250.0f) \* 0.03f;  17 else if (income < 5250)  18 tax = 82.5f + (income - 3750.0f) \* 0.04f;  19 else if (income < 7000)  20 tax = 142.5f + (income - 5250.0f) \* 0.05f;  21 else  22 tax = 230.0f + (income - 7000.0f) \* 0.06f;  23  24 printf("tax due: %.2f \n", tax);  25  26 return 0;  27 } |
| 1. Modify the upc.c program of Section 4.1 so that itt checks whether a UPC is valid. After the user enters a UPC, the program will display either VALID or NOT VALID.   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int sum\_digit1, sum\_digit2, check\_digit,  6 d1, d2, d3, d4, d5, d6,  7 d7, d8, d9, d10,d11,d12;  8  9 printf("Enter the 12 digits of a UPC: ");  10 scanf("%1d %1d%1d%1d%1d%1d %1d%1d%1d%1d%1d%1d",  11 &d1, &d2, &d3, &d4, &d5, &d6,  12 &d7, &d8, &d9, &d10,&d11,&d12  13 );  14  15 sum\_digit1 = d1 + d3 + d5 + d7 + d9 + d11;  16 sum\_digit2 = d2 + d4 + d6 + d8 + d10;  17  18 check\_digit = 9 - ((sum\_digit1 \* 3 + sum\_digit2) - 1) % 10;  19  20 printf((check\_digit == d12) ?  21 "VALID \n" : "INVALID \n"  22 );  23  24 return 0;  25 } |
| 1. Write a program that finds the largest and smallest of four integers entered by the user   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int num1, num2, num3, num4;  6 int largest, smallest;  7  8 scanf("%d %d %d %d", &num1, &num2, &num3, &num4);  9  10 if (num1 < num2) {  11 if (num3 < num4) {  12 largest = (num2 < num4) ? (num4) : (num2);  13 smallest = (num1 < num3) ? (num1) : (num3);  14 } else {  15 largest = (num2 < num3) ? (num3) : (num2);  16 smallest = (num1 < num4) ? (num1) : (num4);  17 }  18 } else {  19 if (num3 < num4) {  20 largest = (num1 < num4) ? (num4) : (num1);  21 smallest = (num2 < num3) ? (num2) : (num3);  22 } else {  23 largest = (num1 < num3) ? (num3) : (num1);  24 smallest = (num2 < num4) ? (num2) : (num4);  25 }  26 }  27  28 printf("smallest: %d \n", smallest);  29 printf("largest: %d \n", largest);  30  31 return 0;  32 } |
| 1. Write a program that asks user to enter a time (expressed in hours and minutes, using the 24-hour clock). The program then displays the departure and arrival times for the flight whose departure time is closest to that entered by the user:   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int hour, minute, convert;  6  7 printf("Enter a 24-hour time: ");  8 scanf("%d:%d", &hour, &minute);  9  10 convert = hour \* 60 + minute;  11  12 if (convert < (8 \* 60) + 0) {  13 hour = 8; minute = 0;  14 convert = (10 \* 60) + 16;  15  16 } else if (convert < (9 \* 60) + 43) {  17 hour = 9; minute = 43;  18 convert = (11 \* 60) + 52;  19  20 } else if (convert < (11 \* 60) + 19) {  21 hour = 11; minute = 19;  22 convert = (13 \* 60) + 31;  23  24 } else if (convert < (12 \* 60) + 47) {  25 hour = 12; minute = 47;  26 convert = (15 \* 60) + 0;  27  28 } else if (convert < (14 \* 60) + 0) {  29 hour = 14; minute = 0;  30 convert = (16 \* 60) + 8;  31  32 } else if (convert < (15 \* 60) + 45) {  33 hour = 15; minute = 45;  34 convert = (17 \* 60) + 55;  35  36 } else if (convert < (19 \* 60) + 0) {  37 hour = 19; minute = 0;  38 convert = (21 \* 60) + 20;  39  40 } else if (convert < (21 \* 60) + 45) {  41 hour = 21; minute = 45;  42 convert = (23 \* 60) + 58;  43  44 } else {  45 hour = minute = -1;  46 }  47  48 if (hour == -1) {  49 printf("You missed all the flight in the day \n");  50 } else {  51 printf("Closest departure time is %d:%.2d %s, ",  52 hour, minute, (hour >= 12) ? ("a.m.") : ("p.m.")  53 );  54  55 printf("arriving at %d:%.2d %s \n",  56 convert / 60, convert % 60, ((convert / 60) >= 12) ? ("a.m.") : ("p.m.")  57 );  58 }  59  60 return 0;  61 } |
| 1. Write a program that prompts the user to enter two dates and then indicates which date comes earlier on the calendar:   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int first\_year, first\_month, first\_day;  6 int second\_year, second\_month, second\_day;  7 int first\_total, second\_total;  8  9 printf(“Enter first date (mm/dd/yy): ”);  10 printf(“Enter second date (mm/dd/yy): ”);  11 scanf("%d/%d/%d", &first\_month, &first\_day, &first\_year);  12 scanf("%d/%d/%d", &second\_month, &second\_day, &second\_year);  13  14 first\_total = first\_year \* 365 + first\_month \* 30 + first\_day;  15 second\_total = second\_year \* 365 + second\_month \* 30 + second\_day;  16  17 if (first\_total == second\_total) {  18 printf("Same day \n");  19 } else if (first\_total < second\_total) {  20 printf("%d/%d/%.2d is earlier than %d/%d/%.2d \n",  21 first\_month, first\_day, first\_year,  22 second\_month, second\_day, second\_year);  23 } else {  24 printf("%d/%d/%.2d is earlier than %d/%d/%.2d \n",  25 second\_month, second\_day, second\_year,  26 first\_month, first\_day, first\_year);  27 }  28  29 return 0;  30 } |
| 1. Using the switch statement, write a program that converts a numerical grade into a letter grade:   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int grade;  6  7 printf("Enter numeric grade: ");  8 scanf("%d", &grade);  9  10 printf("Letter grade: ");  11 switch (grade / 10)  12 {  13 case 10:  14 printf("%s", grade == 100 ? ("A") : ("Illegal numeric grade"));  15 break;  16  17 case 9:  18 printf("A");  19 break;  20 case 8: printf("B"); break;  21 case 7: printf("C"); break;  22 case 6: printf("D"); break;  23  24 case 5: case 4: case 3: case 2: case 1: case 0:  25 printf("%s", grade < 0 ? ("Illegal numeric grade") : ("F"));  26 break;  27  28 default:  29 printf("Illegal numeric grade");  30 } printf("\n");  31  32 return 0;  33 } |
| 1. Write a program that asks the user for a two-digit number, then prints the English word for the number:   1 #include <stdio.h>  2  3 int main(void)  4 {  5 int number;  6  7 printf("Enter a two-digit number: ");  8 scanf("%d", &number);  9  10 switch(number / 10)  11 {  12 case 9: printf("ninety"); break;  13 case 8: printf("eighty"); break;  14 case 7: printf("seventy"); break;  15 case 6: printf("sixty"); break;  16 case 5: printf("fifty"); break;  17 case 4: printf("forty"); break;  18 case 3: printf("thirty"); break;  19 case 2: printf("twenty"); break;  20 }  21  22 if (number / 10 == 1) {  23 switch (number % 10) {  24 case 0: printf("ten"); break;  25 case 1: printf("eleven"); break;  26 case 2: printf("twelve"); break;  27 case 3: printf("thirteen"); break;  28 case 4: printf("fourteen"); break;  29 case 5: printf("fifteen"); break;  30 case 6: printf("sixteen"); break;  31 case 7: printf("seventeen"); break;  32 case 8: printf("eighteen"); break;  33 case 9: printf("nineteen"); break;  34 }  35 } else if (number % 10 != 0) {  36 if (number > 10) printf("-");  37  38 switch (number % 10) {  39 case 1: printf("one"); break;  40 case 2: printf("two"); break;  41 case 3: printf("three"); break;  42 case 4: printf("four"); break;  43 case 5: printf("five"); break;  44 case 6: printf("six"); break;  45 case 7: printf("seven"); break;  46 case 8: printf("eight"); break;  47 case 9: printf("nine"); break;  48 }  49 } printf("\n");  50  51 return 0;  52 } |