PROBLEMS

# 1.

Write a program that will compute the value of the mathematical expression:

x = 3/2 + (5 – 46\*5/12)

# 2.

Write a program that for given value of x will compute and print the value of x^2.

# 3.

Write a program that for a given sides of one triangle, it will print the perimeter and area (values are a = 5, b = 7.5, c = 10.2).

# 4.

Write a program that for given sides of one triangle, it will print the perimeter, semiperimeter and the area of that triangle.

# 5.

Write a program for computing the arithmetic mean of the numbers 3, 5 and 12.

# 6.

Write a program that can calculate the arithmetic mean of 4 numbers.

# 7.

Write a program that will print the remainder from the division of number 19 with 2, 3, 5 and 8.

# 8.

Write a program for computing and printing the circle area and perimeter. The circle radius is read as decimal number.

# 9.

Write a program that reads from standard input two integers and prints their sum, difference, product and division remainder

# 10.

Write a program such than when you enter a lowercase letter it will print an uppercase letter.

# 11.

Write a program such that when you enter a number in form of a character it will print the actual number.

# 12.

Write a program such that when you enter 6 number in form of characters it will print their actual sum.

# 13.

Write a program that reads character from SI and depending if it is lowercase or uppercase will print 1 or 0 accordingly.

# 14.

Write a program where you read from SI price of product, and then will print it’s price with calculated with taxes.

# 15.

Write a program where you read from SI price of product, number of installments and interest rate (percents from 0 to 100). The program should output the amount of the installment and total price including the interest.

# 16.

Three three digit numbers are read from the SI. Find the sum of the first digit of the first number, the second digit of the second number and the third digit of the third number.

# 17.

Write a program that computes the average grade of the semester. The program reads 5 integers and should print out the average as a floating point number with two decimal places.

# 18.

Read a three digit integer from SI. Then print the most significant and least significant digit.

# 19.

Write a program that for a given amount of money, will print the minimum bills and coins needed to make the payment. The amount is an integer read from the SI. The result should be printed in 9 lines, the number of bills or coins for each of them.

Example 1583 denars, will be best payed out as:

0 x 5000

1 x 1000

1 x 500

0 x 100

1 x 50

3 x 10

0 x 5

1 x 2

1 x 1

# 20.

Write a program that reads an integer (days) from SI, and on the way out it prints the number of years, months, and days. We assume that all months have 30 days and each year has 365 days.

# 21.

Write a program where from the birth date read from SI (in format ddmmYYYY) would print the month and day of birth.

# 22.

Read a number from SI. Then print 1 if the number , if not pritnt 0. The solution should be done by using logical operators(without if else).

# 23.

Read a six digit number from the SI. Then print 1 if the number is a symmetric number, or 0 if it isn’t. A symmetric number is a number where the first digit is equal with the last digit, the second digit is equal with the fifth digit and dhe third digit is equal with the fourth digit.

# 24.

Three numbers are read from SI code, the price and the users balance. Calculate the total price including th VAT which is equal to the last two digits of the code and print 1 if the user has enough money to pay or 0 if he has not.

# 25.

Write a program where a certain amount of money that the user has in his transaction account is entered from the keyboard. Then, five other amounts are entered on a new line, separated by a space. They represent some kind of transaction - a certain expense or gain of money. The program prints 1 if after deleting transactions the user still has money in his account, and 0 otherwise.

# 26.

The following data is read from SI for one student of FINKI:

* Index
* six grades from the last semester he listened to

Write a program that will print the following information about the student(see the test examples for the print format):

* average of the student
* print the average to 3 decimal places
* year of studies
* students whose index starts at 21 are second year, 20 are third year, 19 are fourth year, etc.
* is it awarded (1=awarded, 0=not awarded)
* a student is rewarded if he has an average equal to or greater than 9.5.

SOLUTIONS

# 1.

#include **<stdio.h>  
  
int** main(){  
 **float** x=3.0/2 + (5-(46\*5.0/12));  
 printf(**"The value of the expression 3/2 + (5 – 46\*5/12) is %.3f\n"**,x);  
 printf(**"3.0/2 + (5 – 46\*5.0/12) = %.3f\n"**, x);  
 **return** 0;  
}

# 2.

#include **<stdio.h>  
  
int** main(){  
 **float** x;  
 printf(**"Enter a real number!\n"**);  
 scanf(**"%f"**,&x);  
 printf(**"%.4f ^ 2 = %.4f"**,x,x\*x);  
 **return** 0;  
}

# 3.

#include **<stdio.h>**#include **<math.h>  
  
int** main(){  
 **float** a=5, b=7.5, c=10.2, Perimeter,s, Area;  
 Perimeter=a+b+c;  
 s=Perimeter/2;  
 Area= sqrtf(s\*(s-a)\*(s-b)\*(s-c));  
 printf(**"The Perimeter of the triangle with sides 5, 7.5 and 10.2 is: %.3f\n"**,Perimeter);  
 printf(**"The Area of the triangle with sides 5, 7.5 and 10.2 is: %.3f\n"**,Area);  
 **return** 0;  
}

# 4.

#include **<stdio.h>**#include **<math.h>**#define **pi** 3.141459  
  
**int** main() {  
 printf(**"Enter the sides of a triangle: a, b and c.\nWhen you enter the sides of the triangle be sure to follow these rules:\na+b>c ; a+c>b ; b+c>a\n"**);  
 **double** a,b,c;  
 printf(**"a ="**);  
 scanf(**"%lf"**,&a);  
 printf(**"b ="**);  
 scanf(**"%lf"**,&b);  
 printf(**"c ="**);  
 scanf(**"%lf"**,&c);  
 **double** perimeter,semiPerimeter,area,angle\_ab,angle\_ac,angle\_bc,h\_a,h\_b,h\_c,x\_a,x\_b,x\_c,r,R,aR,ar,pR,pr;  
 perimeter=a+b+c;  
 semiPerimeter=perimeter/2;  
 area= sqrt(semiPerimeter\*(semiPerimeter-a)\*(semiPerimeter-b)\*(semiPerimeter-c));  
 angle\_ab= asin((2\*area)/(a\*b))\*180/**pi**;  
 angle\_ac= asin((2\*area)/(a\*c))\*180/**pi**;  
 angle\_bc= asin((2\*area)/(b\*c))\*180/**pi**;  
 x\_a=(a\*a+b\*b-c\*c)/(2\*a);  
 x\_b=(b\*b+c\*c-a\*a)/(2\*b);  
 x\_c=(a\*a+c\*c-b\*b)/(2\*c);  
 h\_a= sqrt(b\*b-(x\_a\*x\_a));  
 h\_b= sqrt(c\*c-(x\_b\*x\_b));  
 h\_c= sqrt(a\*a-(x\_c\*x\_c));  
 R=(a\*b\*c)/(4\*area);  
 aR=**pi**\*R\*R;  
 pR=2\***pi**\*R;  
 r=area/semiPerimeter;  
 ar=**pi**\*r\*r;  
 pr=2\***pi**\*r;  
 printf(**"Perimeter = %.2lf\nSemiperimeter = %.2lf\nArea = %.2lf\n"**,perimeter,semiPerimeter,area);  
 printf(**"Angle between a and b = %.2lf deg.\nAngle between a and c = %.2lf deg.\nAngle between b and c = %.2lf deg.\n"**,angle\_ab,angle\_ac,angle\_bc);  
 printf(**"The height prependicular to a = %.2lf\nThe height prependicular to b = %.2lf\nThe height prependicular to c = %.2lf\n"**,h\_a,h\_b,h\_c);  
 printf(**"The radius of the inner circle of the triangle = %.2lf\nThe perimeter of the inner circle of the triangle = %.2lf\nThe area of the inner circle of the triangle = %.2lf\n"**,r,pr,ar);  
 printf(**"The radius of the outer circle of the triangle = %.2lf\nThe perimeter of the outer circle of the triangle = %.2lf\nThe area of the outer circle of the triangle = %.2lf\n"**,R,pR,aR);  
 **return** 0;  
}

# 5.

#include **<stdio.h>  
  
int** main(){  
 **int** a=3, b=5, c=12;  
 **float** average=(a+b+c)/3.0;  
 printf(**"The arithmetic mean of 3, 5, 12 is: %f"**, average);  
 **return** 0;  
}

# 6.

#include **<stdio.h>  
  
int** main(){  
 **float** a, b, c, d;  
 printf(**"Enter your four numbers!\n"**);  
 scanf(**"%f%f%f%f"**,&a,&b,&c,&d);  
 **float** average=(a+b+c+d)/4;  
 printf(**"Your result is: %f"**, average);  
 **return** 0;  
}

# 7.

#include **<stdio.h>  
  
int** main(){  
 printf(**"19 %% 2 = %d\n"**,19%2);  
 printf(**"19 %% 3 = %d\n"**,19%3);  
 printf(**"19 %% 5 = %d\n"**,19%5);  
 printf(**"19 %% 8 = %d\n"**,19%8);  
 **return** 0;  
}

# 8.

#include **<stdio.h>  
  
int** main(){  
 **float** radius, area, perimeter;  
 printf(**"Enter the length of the radius!\n"**);  
 scanf(**"%f"**, &radius);  
 area=radius\*radius\*3.14;  
 perimeter=2\*radius\*3.14;  
 printf(**"The Area of the circle is: %.2f\n"**, area);  
 printf(**"The Perimeter of the circle is: %.2f\n"**, perimeter);  
 **return** 0;  
}

# 9.

#include **<stdio.h>  
  
int** main(){  
 **int** a,b;  
 printf(**"Enter two integers!\n"**);  
 scanf(**"%d%d"**, &a, &b);  
 printf(**"%d + %d = %d\n"**,a,b, a+b);  
 printf(**"%d - %d = %d\n"**,a,b, a-b);  
 printf(**"%d \* %d = %d\n"**,a,b, a\*b);  
 printf(**"%d / %d = %.3f\n"**,a,b, (**float**)a/b);  
 printf(**"%d %% %d = %d\n"**,a,b, a%b);  
 **return** 0;  
}

# 10.

#include **<stdio.h>  
  
int** main(){  
 **char** c;  
 printf(**"Enter a lowercase letter!\n"**);  
 scanf(**"%c"**, &c);  
 printf(**"The uppercase letter is:\n"**);  
 printf(**"%c"**, c-32);  
 **return** 0;  
}

# 11.

#include **<stdio.h>  
  
int** main(){  
 **char** c;  
 printf(**"Enter a number!\n"**);  
 scanf(**"%c"**, &c);  
  
 printf(**"%d"**, c-**'0'**);  
 **return** 0;  
}

# 12.

#include **<stdio.h>  
  
int** main(){  
 **char** c1,c2,c3,c4,c5,c6;  
 printf(**"Write a six digit number!\n"**);  
 scanf(**"%c%c%c%c%c%c"**, &c1,&c2,&c3,&c4,&c5,&c6);  
 printf(**"The sum of those 6 numbers is:"**);  
 printf(**"%d"**, c1+c2+c3+c4+c5+c6-6\***'0'**);  
 **return** 0;  
}

# 13.

#include **<stdio.h>  
  
int** main(){  
 **char** c;  
 **int** x;  
 printf(**"Enter your letter!\n"**);  
 scanf(**"%c"**, &c);  
 x=(c>=**'a'**)&&(c<=**'z'**) || (c>=**'A'**)&&(c<=**'Z'**);  
 printf(**"%d"**, x);  
  
 **return** 0;  
}

# 14.

#include **<stdio.h>  
  
int** main(){  
 **float** price;  
 scanf(**"%f"**, &price);  
 printf(**"The total price with taxes would be: %3f"**, price\*1.18);  
 **return** 0;  
}

# 15.

#include **<stdio.h>  
  
int** main(){  
 **float** price, interest;  
 **int** installments;  
 printf(**"Enter the price of the product.\n"**);  
 scanf(**"%f"**, &price);  
 printf(**"Enter the number of installments.\n"**);  
 scanf(**"%d"**, &installments);  
 printf(**"Enter the interest rate.\n"**);  
 scanf(**"%f"**, &interest);  
 **float** totalPrice=price\*(1+interest/100);  
 printf(**"The installment amount is: %f\n"**, totalPrice/installments);  
 printf(**"The total price is: %f\n"**, totalPrice);  
 **return** 0;  
}

# 16.

#include **<stdio.h>  
  
int** main(){  
 **int** number1, number2, number3;  
 printf(**"Enter three three digit numbers!\n"**);  
 scanf(**"%d%d%d"**, &number1, &number2, &number3);  
 **int** firstDigit, secondDigit, thirdDigit;  
 firstDigit= number1 / 100;  
 secondDigit= (number2 / 10) % 10;  
 thirdDigit= number3 % 10;  
 printf(**"%d + %d + %d = %d"**, firstDigit, secondDigit, thirdDigit, firstDigit + secondDigit + thirdDigit);  
 **return** 0;  
}

# 17.

#include **<stdio.h>  
  
int** main(){  
 **int** g1,g2,g3,g4,g5;  
 printf(**"Enter your grades!\n"**);  
 scanf(**"%d%d%d%d%d"**, &g1, &g2, &g3, &g4, &g5);  
 printf(**"Your average grade for the semester is: %.2f"**, (**float**)(g1 + g2 + g3 + g4 + g5) / 5);  
 **return** 0;  
}

# 18.

#include **<stdio.h>  
  
int** main(){  
 **int** number;  
 printf(**"Enter a three digit number\n"**);  
 scanf(**"%d"**, &number);  
 printf(**"The most significant digit is: %d\n"**, number/100);  
 printf(**"The least significant digit is: %d\n"**, number%10);  
 **return** 0;  
}

# 19.

#include **<stdio.h>  
  
int** main(){  
 **int** denars,denarsLeftOut, denars2, denars5, denars10;  
 **int** denars50, denars100, denars500, denars1000, denars5000;  
 scanf(**"%d"**, &denars);  
 denars5000=denars/5000;  
 denars1000=denars%5000/1000;  
 denars500=denars%5000%1000/500;  
 denars100=denars%5000%1000%500/100;  
 denars50=denars%5000%1000%500%100/50;  
 denars10=denars%5000%1000%500%100%50/10;  
 denars5=denars%5000%1000%500%100%50%10/5;  
 denars2=denars%5000%1000%500%100%50%10%5/2;  
 denarsLeftOut=denars%5000%1000%500%100%50%10%5%2;  
 printf(**"%d x %d\n"**,denars5000, 5000);  
 printf(**"%d x %d\n"**,denars1000, 1000);  
 printf(**"%d x %d\n"**,denars500, 500);  
 printf(**"%d x %d\n"**,denars100, 100);  
 printf(**"%d x %d\n"**,denars50, 50);  
 printf(**"%d x %d\n"**,denars10, 10);  
 printf(**"%d x %d\n"**,denars5, 5);  
 printf(**"%d x %d\n"**,denars2, 2);  
 printf(**"%d x %d\n"**,denarsLeftOut, 1);  
 **return** 0;  
}

Another way

#include **<stdio.h>  
  
int** main(){  
 **int** money;  
 scanf(**"%d"**,&money);  
   
 printf(**"%d x 5000\n"**, money / 5000);  
 money%=5000;  
 printf(**"%d x 1000\n"**, money / 1000);  
 money%=1000;  
 printf(**"%d x 500\n"**, money / 500);  
 money%=500;  
 printf(**"%d x 100\n"**, money / 100);  
 money%=100;  
 printf(**"%d x 50\n"**, money / 50);  
 money%=50;  
 printf(**"%d x 10\n"**, money / 10);  
 money%=10;  
 printf(**"%d x 5\n"**, money / 5);  
 money%=5;  
 printf(**"%d x 2\n"**, money / 2);  
 money%=2;  
 printf(**"%d x 1\n"**, money);  
 **return** 0;  
}

# 20.

#include **<stdio.h>  
  
int** main(){  
 **int** days, months, years, daysLeft;  
 printf(**"Enter a number of days!\n"**);  
 scanf(**"%d"**, &days);  
 years=days/365;  
 months=days%365/30;  
 daysLeft=days%365%30;  
 printf(**"Years: %d, months: %d, days: %d"**,years, months, daysLeft);  
 **return** 0;  
}

# 21.

#include **<stdio.h>  
  
int** main(){  
 **int** date,day, month, year;  
 printf(**"Write your birth date(in format ddmmYYYY)\n"**);  
 scanf(**"%d"**, &date);  
 day=date/1000000;  
 month=(date/10000)%100;  
 year=date%10000;  
 printf(**"Your birthday date is: %.2d.%.2d.%d"**,day, month, year);  
 **return** 0;  
}

# 22.

#include **<stdio.h>  
  
int** main(){  
 **int** n;  
 scanf(**"%d"**,&n);  
 printf(**"%d"**,(n>-100 && n<100) || (n>=200 && n<300));  
 **return** 0;  
}

# 23.

#include **<stdio.h>  
  
int** main(){  
 **int** x;  
 scanf(**"%d"**,&x);  
 printf(**"%d"**,(x/100000==x%10) && (x/10000%10==x/10%10) && (x/1000%10==x/100%10));  
  
 **return** 0;  
}

# 24.

#include **<stdio.h>  
  
int** main(){  
 **float** price, usersBalance, totalPrice;  
 **int** code, VAT;  
 scanf(**"%d%f%f"**,&code,&price,&usersBalance);  
 VAT=code%100;  
 totalPrice=price\*(1+VAT/100.0);  
 printf(**"The Total price is: %f\n"**,totalPrice);  
 printf(**"%d"**,totalPrice<=usersBalance);  
  
 **return** 0;  
}

# 25.

#include **<stdio.h>  
  
int** main() {  
 **float** money;  
 scanf(**"%f"**,&money);  
 **float** a,b,c,d,e;  
 scanf(**"%f%f%f%f%f"**,&a,&b,&c,&d,&e);  
 **int** x=money-(a+b+c+d+e)>0;  
 printf(**"%d"**,x);  
 **return** 0;  
}

# 26.

#include **<stdio.h>  
  
int** main() {  
 **int** index, g1,g2,g3,g4,g5,g6;  
 **float** average;  
 scanf(**"%d%d%d%d%d%d%d"**,&index,&g1,&g2,&g3,&g4,&g5,&g6);  
 average=(g1+g2+g3+g4+g5+g6)/6.0;  
 printf(**"Average: %.3f\n"**,average);  
 printf(**"Student: %d\nYear %d\n"**,index,23-(index/10000));  
 printf(**"%d"**,average>=9.5);  
 **return** 0;  
}