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Language: C++

Assignment: Project A

Description: This project will show all the different skills

used in this course

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/\* MODIFICATIONS

Feb 4 2024 - Completed header asking for name and

outputing the first name back

Feb 18 2024 - Gave user options to decide on square root,

power of a number, finding out letter grade based on GPA, or exit

Mar 3 2024 - Modified the welcome section to be more clean and

efficent. Put the options and swicth in a loop until the user

wants to exit. Added exit case and default to the switch. Added

another option to make a triangle. Added box around options

Mar 17 2024 - Modified swicth statement and commented on case

4 and 0. Made cases 3 and 4 into user defined functions. made 2 more

user defined functions. One for calculating weekly pay and one for

showing yearly interest. I added them in the menu and fixed the box

Apirl 7 2024 - I changed the global variables rate and hours to local

and set then to 0.0. Made the orignal header into a user defined function.

Made a user defined function for the user entering their first and last

name then welcomes them.

Apirl 21 2024 - I added a function to ask the user for 5 grades,

display them and displays the average

May 5 2024 - I added a structure for contacts and an user defined function

to display the prepopulated array of contacts

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#include <iostream>

#include <cmath> // for some of the math functions

#include <iomanip> // for dollars and cents

using namespace std;

//define structure

struct Contact

{

string firstName;

string lastName;

string phoneNum;

};

//function prototypes

void GPA();

void rightTriangle();

void calculatePay(double rate, double hours);

void displayInterest();

void displayHeader();

void firstLastName(string&, string&);

void getGrades(double[], int);

void displayGrades(double[], int);

double averageGrade(double[], int);

void printContacts(Contact[]);

int main()

{

//\*\*\*\*\*\* Variable section \*\*\*\*\*\*\*\*\*

string firstName;

string lastName;

int personsChoice;

int squareRoot, thePower, baseX, powerY;

double rate = 0.0, hours = 0.0;

const int ARRAY\_SIZE = 5;

double grades[ARRAY\_SIZE];

double average;

Contact contactList[3] =

{

"Kevin", "Roark", "210-837-0600",

"Bart", "Simpson", "210-444-1234",

"Sally", "Smith", "210-324-7895"

};

//\*\*\*\*\*\* Welcome Section \*\*\*\*\*\*\*\*\*\*

//Output welcome header

//prompt user for first name and store

//prompt user for last name and store

//Output a welcome message to the user

//displays header

displayHeader();

//user enters first and last name and

firstLastName(firstName, lastName);

//welcome user

cout << "Welcome to my course project " << firstName

<< " " << lastName << "!" << endl;

cout << "\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

do

{

// box around the options

cout << "\n|-------------------------------------------------------------------|\n";

//give user the options to what they want to do

cout << "| Enter 1 to Calculate the square root"

<< " |" << endl;

cout << "| Enter 2 to Enter X to the Y power"

<< " |" << endl;

cout << "| Enter 3 to Convert the Numerical GPA "

<< " to a Letter Grade |" << endl;

cout << "| Enter 4 to Create a Right Triangle"

<< " |" << endl;

cout << "| Enter 5 to Calculate weekly pay"

<< " |" << endl;

cout << "| Enter 6 to Calculate interest earned"

<< " |" << endl;

cout << "| Enter 7 to Calculate grades"

<< " |" << endl;

cout << "| Enter 8 to Print Contacts"

<< " |" << endl;

cout << "| Enter 0 to exit"

<< " |" << endl;

cout << "|-------------------------------------------------------------------|" << endl;

// have user input their request

cout << "Enter your request: ";

cin >> personsChoice;

//each case will take them to the option they requested

switch (personsChoice)

{

//case 1 will square root the number they decide to input

case 1:

cout << "Enter a number to calculate the Square Root: ";

cin >> squareRoot;

cout << "The square root of " << squareRoot << " is "

<< sqrt(squareRoot) << endl;

break;

//case 2 will have them choose a base of X and a power of Y

// and calculate

case 2:

cout << "Enter a number X to raise to the power Y\n";

cout << "Enter X: ";

cin >> baseX;

cout << "Enter Y: ";

cin >> powerY;

cout << baseX << " to the " << powerY << " power is "

<< pow(baseX, powerY) << endl;

break;

//case 3 will ask for their GPA to convert to a letter grade

case 3: GPA();

break;

// prompts user to enter a number for the size of their

//triangle

case 4: rightTriangle();

break;

// prompts user for the hourly pay and amount of hours worked

case 5: calculatePay(rate, hours);

break;

// prompts user for an intial balance and percentage of

//yearly interest accquired on that balance and calculates

// for the next 5 years

case 6: displayInterest();

break;

// prompts user for 5 grades then displays them and averages

//them out

case 7: getGrades(grades, ARRAY\_SIZE);

displayGrades(grades, ARRAY\_SIZE);

average = averageGrade(grades, ARRAY\_SIZE);

cout << "The average grade is " << average << endl;

break;

//prints out contact list

case 8: printContacts(contactList);

break;

//informs user program has ended

case 0:

cout << "You have exited the program.";

return 0;

default:

//informs user if has input an unavaiable number

cout << "Invaild Number\n";

}

//ends loop

} while (personsChoice != 0);

return 0;

} // end of main

//function definitions

void GPA()

{

// declares local variables

double gradePointAverage;

//prompts the user for their numerical grade

cout << "Enter your numerical grade: ";

cin >> gradePointAverage;

// picks basaed on 4.0 gpa scale

if (gradePointAverage == 4)

{

//if user has a 4.0 then they will get a A

cout << "Your letter grade is an A\n";

}

//if user has a 3.0 then they will get a B

else if (gradePointAverage >= 3)

{

cout << "Your letter grade is an B\n";

}

//if user has a 2.0 then they will get a C

else if (gradePointAverage >= 2)

{

cout << "Your letter grade is an C\n";

}

//if user has a 1.0 then they will get a D

else if (gradePointAverage >= 1)

{

cout << "Your letter grade is an D\n";

}

//if user has less than 1 then they get a F

else

{

cout << "Your letter grade is an F\n";

}

}

void rightTriangle()

{

//declare local variable

int triangleSize;

// has user enter the size of a triangle they

//want the program to make

cout << "Enter the size of the triangle: ";

cin >> triangleSize;

//loop starts at 1 until it hits the size the user wants

//for both asterisks and endlines

for (int i = 1; i <= triangleSize; i++)

{

cout << endl;

for (int asterisks = 1; asterisks <= i; asterisks++)

{

cout << "\*";

}

}

}

void calculatePay(double rate, double hours)

{

//declare local variables

double weeklySum;

//prompts the user to input hourly rate and hours worked

cout << "What is your hourly rate: ";

cin >> rate;

cout << "How many hours did you work this week: ";

cin >> hours;

//if hours are less than 40 they get paid by rate \* hours

//if hours are more than 40 they get paid rate \* hours until

//they hit more than 40 hours. after that its (1.5 \* rate) \* hours

if (hours <= 40)

{

//calculate normal hours and display it

weeklySum = hours \* rate;

cout << "Your weekly pay is " << weeklySum << endl;

}

else

{

//calculate normal hours + overtime and display it

weeklySum = (rate \* 40) + ((hours - 40) \* rate \* 1.5);

cout << "Your weekly pay is " << weeklySum << endl;

}

}

void displayInterest()

{

//declare local variables

double intialBalance, interestRate, interest;

//prompt user to enter intial balance

cout << "Enter intial balance: ";

cin >> intialBalance;

//prompt user to enter intertest rate

cout << "Enter yearly interest rate: ";

cin >> interestRate;

// increment up by one until it hits year 5

for (int year = 1; year <= 5; year++)

{

//calculate total balance

interest = intialBalance \* interestRate;

//add interest to each year

intialBalance += interest;

//display each years balance

//sets 2 decimal places for cents

cout << "Year " << year << ": " << fixed

<< setprecision(2) << intialBalance << endl;

}

}

//displays header

void displayHeader()

{

cout << "\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n"

<< "\* Programming 1 Course Project \*\n"

<< "\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*" << endl;

}

//asks user for first and last name

void firstLastName(string& usersFirstName, string& usersLastName)

{

// usersFirstName is the variable for the user define function

// firstName is a local variable for main

cout << "Please enter your First Name: ";

cin >> usersFirstName;

cout << "Please enter your Last Name: ";

cin >> usersLastName;

}

//gets grades from user

void getGrades(double pGrades[], int pSize)

{

//asks user for 5 grades

for (int i = 0; i < pSize; i++)

{

cout << "Enter grade " << i + 1 << ": ";

cin >> pGrades[i];

}

}

//displays the gardes input by user

void displayGrades(double pGrades[], int pSize)

{

//set the grades to 2 decimal points

cout << fixed << showpoint << setprecision(2);

//shows user the 5 grades

for (int i = 0; i < pSize; i++)

cout << "Grade " << i + 1 << ": " << pGrades[i] << endl;

}

//calculates average of grades

double averageGrade(double pGrades[], int pSize)

{

//declare local variables

double sum = 0;

// iterate throught array and add the grades to sum

for (int i = 0; i < pSize; i++)

{

sum += pGrades[i];

}

//return sum/size to get average

return (sum / pSize);

}

//prints contact list for user

void printContacts(Contact pContactList[])

{

//for loop loops through the array to show all the information

for (int i = 0; i < 3; i++)

{

cout << "Name: " << pContactList[i].firstName << " "

<< pContactList[i].lastName << endl;

cout << "Phone Number: " << pContactList[i].phoneNum << endl;

}

}