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|  | **CP**  **BSCS 1-A**  **Department of Computer Science**  **Bahria University, Lahore Campus** |

**Assignment: [1]**

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| **Evaluation of CLO** | **Question Number** | **Marks** | **Obtained Marks** |
| **CLO1: Demonstrate the understanding of the basic concepts of programming** | 1,2,3,4,5 | 1,2,1,4,2 |  |
|  |  |  |
| **Total Marks** | | **10** |  |

***Question No.1***

***Project Submission:***

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| ***“SPENDING SMART”***  **CODE :**  #include <iostream>  #include <string>  using namespace std;  // Helper function to get a double input with validation  double getInput(const string& prompt) {  double value;  cout << prompt << endl;  while (true) {  cin >> value;  if (cin.fail()) {  cout << "Invalid input. Please enter a numeric value.\n";  cin.clear();  cin.ignore(10000, '\n');  } else {  cin.ignore(10000, '\n');  return value;  }  cout << prompt << endl;  }  }  // Helper function to get an integer input with validation  int getIntInput(const string& prompt) {  int value;  cout << prompt << endl;  while (true) {  cin >> value;  if (cin.fail()) {  cout << "Invalid input. Please enter a whole number.\n";  cin.clear();  cin.ignore(10000, '\n');  } else {  cin.ignore(10000, '\n');  return value;  }  cout << prompt << endl;  }  }  // Helper function to ask yes/no questions  bool askYesNo(const string& question) {  char response;  while (true) {  cout << question << " (y/n): ";  cin >> response;  cin.ignore(10000, '\n');  if (response == 'y' || response == 'Y')  return true;  else if (response == 'n' || response == 'N')  return false;  else  cout << "Invalid input. Please enter 'y' or 'n'.\n";  }  }  // Function to print the expense report in a table format (using basic formatting)  void printExpenseReportTable(  const string &name,  int age,  const string &occupation,  double rent,  double electricity,  double gas,  double subscriptions,  double entertainment,  double groceries,  double traveling,  double transport,  double personalCare,  double selectedAmount,  double totalExpenses,  double budget  ) {  cout << "\n--- Expense Report Table for " << name << " ---\n";  cout << "Category\t\tAmount\n";  cout << "--------------------------------------\n";  cout << "Rent\t\t\t" << rent << "\n";  cout << "Electricity\t\t" << electricity << "\n";  cout << "Gas\t\t\t" << gas << "\n";  cout << "Subscriptions\t\t" << subscriptions << "\n";  cout << "Entertainment\t\t" << entertainment << "\n";  cout << "Groceries\t\t" << groceries << "\n";  cout << "Traveling\t\t" << traveling << "\n";  cout << "Transport\t\t" << transport << "\n";  cout << "Personal Care\t\t" << personalCare << "\n";  cout << "financialChoice\t\t" << selectedAmount << "\n";  cout << "--------------------------------------\n";  cout << "Total Expenses\t\t" << totalExpenses << "\n";  if (budget >= 0) {  double remaining = budget - totalExpenses;  cout << "Remaining Budget\t" << remaining << "\n";  if (totalExpenses > budget) {  cout << "Warning! You have exceeded your budget!\n";  } else {  cout << "You are within your budget!\n";  }  } else {  cout << "Budget not set.\n";  }  cout << "--------------------------------------\n";  cout << "Thank you, " << name << "! Keep tracking your expenses.\n";  }  // Helper function to get a string with only alphabetic characters and spaces  void getAlphaInput(const string& prompt, string& result) {  while (true) {  cout << prompt;  getline(cin, result);  bool valid = true;  if (result.empty()) valid = false;  for (int i = 0; i < result.length(); ++i) {  char c = result[i];  if (!((c >= 'A' && c <= 'Z') || (c >= 'a' && c <= 'z') || c == ' ')) {  valid = false;  break;  }  }  if (valid) break;  cout << "Invalid input. Please enter only alphabetic characters.\n";  }  }  void runExpenseCalculator(const string& name, int age, const string& occupation, double budget) {  double rent = 0, electricity = 0, gas = 0, subscriptions = 0;  double entertainment = 0, groceries = 0, traveling = 0, transport = 0, personalCare = 0;  double selectedAmount = 0, totalExpenses = 0;  int financialChoice = 0;  if (askYesNo("Do you want to enter Rent amount?")) {  rent = getInput("Enter Rent amount: ");  }  if (askYesNo("Do you want to enter Electricity bill amount?")) {  electricity = getInput("Enter Electricity bill amount: ");  }  if (askYesNo("Do you want to enter Gas bill amount?")) {  gas = getInput("Enter Gas bill amount: ");  }  if (askYesNo("Do you want to enter Subscription charges?")) {  subscriptions = getInput("Enter Subscription charges: ");  }  if (askYesNo("Do you want to enter Entertainment budget?")) {  entertainment = getInput("Enter Entertainment budget: ");  }  if (askYesNo("Do you want to enter Groceries budget?")) {  groceries = getInput("Enter Groceries budget: ");  }  if (askYesNo("Do you want to enter Traveling budget?")) {  traveling = getInput("Enter Traveling budget: ");  }  if (askYesNo("Do you want to enter Transport budget?")) {  transport = getInput("Enter Transport budget: ");  }  if (askYesNo("Do you want to enter Personal Care budget?")) {  personalCare = getInput("Enter Personal Care budget: ");  }  cout << "\nChoose one financial option:\n";  cout << "1. Savings\n2. Insurance\n3. Investments\n";  while (true) {  financialChoice = getIntInput("Enter choice (1/2/3): ");  if (financialChoice < 1 || financialChoice > 3) {  cout << "Invalid choice. Please enter a valid option (1/2/3).\n";  } else {  break;  }  }  switch (financialChoice) {  case 1:  if (askYesNo("Do you want to enter Savings amount?")) {  selectedAmount = getInput("Enter Savings amount: ");  }  break;  case 2:  if (askYesNo("Do you want to enter Insurance amount?")) {  selectedAmount = getInput("Enter Insurance amount: ");  }  break;  case 3:  if (askYesNo("Do you want to enter Investment amount?")) {  selectedAmount = getInput("Enter Investment amount: ");  }  break;  }  totalExpenses = rent + electricity + gas + subscriptions +  entertainment + groceries + traveling + transport + personalCare +  selectedAmount;  cout << "\n--- Expense Report for " << name << " ---\n";  printExpenseReportTable(  name, age, occupation,  rent, electricity, gas, subscriptions,  entertainment, groceries, traveling, transport, personalCare,  selectedAmount,  totalExpenses,  budget  );  }  int main() {  int choice;  string name, occupation;  int age;  double budget;  cout << "Welcome to Spending Smart!\n";  cout << "Choose mode:\n1. Offline Mode\n2. Online Mode\n";  while (true) {  choice = getIntInput("Enter choice (1/2): ");  if (choice != 1 && choice != 2) {  cout << "Invalid choice. Please enter 1 for Offline or 2 for Online.\n";  } else {  break;  }  }  if (choice == 1) {  cout << "--- OFFLINE MODE ---\n";  getAlphaInput("Enter Name: ", name);  while (true) {  age = getIntInput("Enter Age: ");  if (age > 0) break;  cout << "Age must be greater than 0.\n";  }  getAlphaInput("Enter Occupation: ", occupation);  } else if (choice == 2) {  cout << "--- ONLINE MODE ---\n";  string email, accNum, pin;  cout << "Enter Email/Phone: ";  getline(cin, email);  cout << "Enter Account Number: ";  getline(cin, accNum);  cout << "Enter PIN: ";  getline(cin, pin);  cout << "[Sign In Successful]\n";  name = "User 1";  age = 18;  occupation = "Student";  }  // Ask if user wants to enter budget  char budgetChoice;  while (true) {  cout << "Do you want to enter your total budget? (y/n): ";  cin >> budgetChoice;  cin.ignore(10000, '\n');  if (budgetChoice == 'y' || budgetChoice == 'Y') {  budget = getInput("Enter your total budget: ");  break;  } else if (budgetChoice == 'n' || budgetChoice == 'N') {  budget = -1;  break;  } else {  cout << "Invalid input. Please enter 'y' or 'n'.\n";  }  }  runExpenseCalculator(name, age, occupation, budget);  return 0;  } |