# Group 3: Nguyễn Đức Duy Nguyễn Công Hoàng Trần Quốc Bảo

Project 4

## Checkpoint

#### 1. Explain why you cannot convert the following if/else if statement into a

#### switch statement.

if (temp == 100 )

x = 0;

else if (population > 1000)

x == 1;

else if (rate < .1)

x = -1;

It cannot be converted to a switch statement because a switch statement requires discrete value whereas in the second condition “population > 1000” and “rate < .1” is not a discrete value but a range.

#### 2. Rewrite the following program. Use a switch statement instead of the if/else if statement.

#### 

**#include <iostream>**

**using namespace** std;

**int** main() {

**int** selection;

cout << "Which formula do you want to see?\n\n";

cout << "1. Area of a circle\n";

cout << "2. Area of a rectangle\n";

cout << "3. Area of a cylinder\n";

cout << "4. None of them! \n";

cin >> selection;

**switch** (selection) {

**case** 1:

cout << "Pi times radius squared\n";

**break**;

**case** 2:

cout << "Length times width\n";

**break**;

**case** 3:

cout << "Pi times radius squared times height\n";

**break**;

**case** 4:

cout << "Well okay then, good bye!\n";

**break**;

**default**:

cout << "Not good with numbers, eh?\n";

}

**return** 0;

}

## Programming Challenges

#### 1. Roman Numeral Converter Write a program that asks the user to enter a number within the range of 1 through 10. Use a switch statement to display the Roman numeral version of that number. Input Validation: Do not accept a number less than 1 or greater than 10.

**#include <iostream>**

**using namespace** std;

**int** main() {

**int** i;

cout << "Enter a number within the range of 1 and 10 "

<< "to convert to Roman Numeral:\t";

cin >> i;

// Separate INPUT and OUTPUT by 3 line and then flush the stream

cout << "\n\n" << endl;

cout << "Number " << i << " is ";

**switch** (i) {

**case** 1:

cout << "I";

**break**;

**case** 2:

cout << "II";

**break**;

**case** 3:

cout << "III";

**break**;

**case** 4:

cout << "IV";

**break**;

**case** 5:

cout << "V";

**break**;

**case** 6:

cout << "VI";

**break**;

**case** 7:

cout << "VII";

**break**;

**case** 8:

cout << "VIII";

**break**;

**case** 9:

cout << "IX";

**break**;

**case** 10:

cout << "X";

**break**;

**default**:

cout << "not in range of 1 and 10. "

<< "Please restart the program and enter the valid number.";

}

// A newline at the end of a program will result in better

// looking interface for some types of terminal

cout << endl;

**return** 0;

}

#### 2. Magic Dates The date June 10, 1960, is special because when we write it in the following format, the month times the day equals the year. 6/10/60 Write a program that asks the user to enter a month (in numeric form), a day, and a twodigit year. The program should then determine whether the month times the day is equal to the year. If so, it should display a message saying the date is magic. Otherwise, it should display a message saying the date is not magic.

**#include <iostream>**

**using namespace** std;

**int** main() {

**int** month, day, year;

cout << "Enter a month:\t";

cin >> month;

**if** (month < 1 || month > 12) {

cout << "Month can only range from 1-12. Please restart.";

**return** 1;

}

cout << "Enter a day:\t";

cin >> day;

**if** (day < 1 || day > 31) {

cout << "Day can only range from 1-31. Please restart.";

**return** 1;

}

cout << "Enter a 2 digits year (2018 -> 18):\t";

cin >> year;

**if** (year > 0) {

cout << "Receive " << year << " ... ";

year %= 100;

cout << "Taking " << year;

} **else** {

cout << "BC years do not count. Please restart.";

**return** 1;

}

cout << "\n\n\n" << month << '/' << day << '/' << year;

**if** (month \* day == year)

cout << " is magic date." << endl;

**else**

cout << " is not magic date." << endl;

**return** 0;

}

#### 3. Cinema Ticket Problem

#include <iostream>

#include <string>

#include <iomanip>

**using namespace** std;

**int** main() {

**int** age;

**double** multiplier = 1.0, cost = 7.0;

string clazz, movie, date = "Weekday";

**const int** WIDTH\_COLUMN1 = 35,

WIDTH\_COLUMN2 = 15;

**const int** CHILD\_AGE\_CEIL = 18,

SENIOR\_AGE\_FLOOR = 65;

**const int** MAX\_BUFFER = 256;

**const float** CHILD\_DISCOUNT\_RATE = 0.5,

SENIOR\_DISCOUNT\_RATE = 0.3;

cout << setw(WIDTH\_COLUMN1) << left << "How old are you:";

**do** {

cin >> age;

**if** (age < 0 || age > 129) {

cout << "Invalid age. Enter a valid age\n";

**continue**;

}

// Initialize Customer Class and adjust multiplier

// so that the price will be calculated after discount

// Also announce customer his discount

**if** (age < CHILD\_AGE\_CEIL) {

multiplier = 1 - CHILD\_DISCOUNT\_RATE;

clazz = "Child";

cout << "Child: Discount " << CHILD\_DISCOUNT\_RATE \* 100 << '%' << endl;

} **else if** (age < SENIOR\_AGE\_FLOOR) {

clazz = "Adult";

} **else** {

multiplier = 1 - SENIOR\_DISCOUNT\_RATE;

clazz = "Senior Citizen";

cout << "Senior Citizen: Discount " << SENIOR\_DISCOUNT\_RATE \* 100

<< '%' << endl;

}

} **while** (age <0 || age > 129);

**char** y\_or\_n;

cout << setw(WIDTH\_COLUMN1) << left << "Is your ticket on weekend: (Y/N)";

**do** {

cin.ignore(MAX\_BUFFER, '\n');

cin.get(y\_or\_n);

**switch** (y\_or\_n) {

**case** 'y':

**case** 'Y':

cost = 10.0;

date = "Weekend";

**break**;

**case** 'n':

**case** 'N':

**break**;

**default**:

cout << "\nYou must only enter yes or no. "

<< "Try again with Y/y/N/n.\n";

**continue**;

}

} **while** (y\_or\_n != 'y' && y\_or\_n != 'Y' && y\_or\_n != 'n' && y\_or\_n != 'N');

// Select pre-selected movie or a movie of

// customer preference

**int** choice = -1;

cout << setw(WIDTH\_COLUMN1) << left << "Which movie would you like to see:"

<< endl;

cout << setw(WIDTH\_COLUMN1) << left << "1. Venom" << endl;

cout << setw(WIDTH\_COLUMN1) << left << "2. Mr.Bean" << endl;

cout << setw(WIDTH\_COLUMN1) << left << "3. X-men" << endl;

cout << setw(WIDTH\_COLUMN1) << left << "4. Other (Enter name)" << endl;

cout << "Your choice: ";

**do** {

cin >> choice;

**switch** (choice) {

**case** 1:

movie = "Venom";

**break**;

**case** 2:

movie = "Mr.Bean";

**break**;

**case** 3:

movie = "X-men";

**break**;

**case** 4:

cout << setw(WIDTH\_COLUMN1) << left << "Then enter your preferred movie:";

cin.ignore(MAX\_BUFFER, '\n');

getline(cin, movie);

**break**;

**default**:

cout << "\nYou enter an invalid information."

<< "Please restart the program.\n";

**return** 1;

}

} **while** (choice < 1 || choice > 4);

cout << setw(WIDTH\_COLUMN1) << left << "Movie selected:" << movie << endl;

cout << "\n\n\n\n\n" << endl;

cout << fixed << showpoint << setprecision(1);

/\*\*

\* The following code will look like this:

\* -----------------------------------------------

\* |Movie: Venom|

\* |Class: Child|

\* |Date: Weekday|

\* |Regular Price: $ 7.0|

\* |Discount Price: $ 3.5|

\* -----------------------------------------------

\*/

cout << setfill('-') << setw(WIDTH\_COLUMN1 + WIDTH\_COLUMN2 + 2)

<< "" << setfill(' ') << endl;

cout << '|' << left << setw(WIDTH\_COLUMN1) << "Movie:" << right

<< setw(WIDTH\_COLUMN2) << movie << '|' << endl;

cout << '|' << left << setw(WIDTH\_COLUMN1) << "Class:" << right

<< setw(WIDTH\_COLUMN2) << clazz << '|' << endl;

cout << '|' << left << setw(WIDTH\_COLUMN1) << "Date:" << right

<< setw(WIDTH\_COLUMN2) << date << '|' << endl;

cout << '|' << left << setw(WIDTH\_COLUMN1) << "Regular Price:"

<< '$' << right << setw(WIDTH\_COLUMN2 - 1) << 7.0

<< '|'

<< endl;

cout << '|' << left << setw(WIDTH\_COLUMN1) << "Discount Price:"

<< '$' << right << setw(WIDTH\_COLUMN2 - 1)

<< cost \* multiplier << '|'

<< endl;

cout << setfill('-') << setw(WIDTH\_COLUMN1 + WIDTH\_COLUMN2 + 2) << "" << endl;

**return** 0;

}

#### 4. Time Calculator Write a program that asks the user to enter a number of seconds. - There are 60 seconds in a minute. If the number of seconds entered by the user is greater than or equal to 60, the program should display the number of minutes in that many seconds. - There are 3,600 seconds in an hour. If the number of seconds entered by the user is greater than or equal to 3,600, the program should display the number of hours in that many seconds. - There are 86,400 seconds in a day. If the number of seconds entered by the user is greater than or equal to 86,400, the program should display the number of days in that many seconds.

**#include <iostream>**

**using namespace** std;

**int** main() {

**long** seconds;

cout << "Enter a number of seconds:\t";

cin >> seconds;

/\*\*

\* The following code does not need to cast to long

\* because division of a long to a number in cout

\* stream result in a long type already.

\*/

**if** (seconds < 60) {

cout << seconds << " seconds" << endl;

} **else if** (seconds < 3600) {

cout << seconds / 60 << " minutes" << endl;

} **else if** (seconds < 86400) {

cout << seconds / 3600 << " hours" << endl;

} **else** {

cout << seconds / 86400 << " days" << endl;

}

**return** 0;

}

#### 5. Software Sales A software company sells a package that retails for $99. Quantity discounts are given according to the following table.

#### Write a program that asks for the number of units sold and computes the total cost of the purchase. Input Validation: Make sure the number of units is greater than O.

**#include <iostream>**

**using namespace** std;

**int** main() {

**int** q;

**double** multiplier = 1.0;

**const double** price = 99.0;

**const double** DISCOUNT\_TIER\_1 = 0.2,

DISCOUNT\_TIER\_2 = 0.3,

DISCOUNT\_TIER\_3 = 0.4,

DISCOUNT\_TIER\_4 = 0.5;

cout << "How many packages do you want to buy:\t";

cin >> q;

// This block of code is separated from other blocks because its functionality

// is different from others

**if** (q <= 0) {

cout << "Packages number can not be smaller or equal to 0. "

<< "Please restart and re-enter the valid input." << endl;

**return** 1;

}

**if** (q < 10) {

cout << "No discount" << endl;

} **else if** (q < 20) {

cout << DISCOUNT\_TIER\_1 \* 100 << "% discount." << endl;

multiplier -= DISCOUNT\_TIER\_1;

} **else if** (q < 50) {

cout << DISCOUNT\_TIER\_2 \* 100 << "% discount." << endl;

multiplier -= DISCOUNT\_TIER\_2;

} **else if** (q < 100) {

cout << DISCOUNT\_TIER\_3 \* 100 << "% discount." << endl;

multiplier -= DISCOUNT\_TIER\_3;

} **else** {

cout << DISCOUNT\_TIER\_4 \* 100 << "% discount." << endl;

multiplier -= DISCOUNT\_TIER\_4;

}

cout << "Total cost: $" << price \* q \* multiplier << endl;

**return** 0;

}

#### 6. Write a program to play “High/Low”. The program “picks” a number. The human player tries to guess it. The program indicates if the guess is too high, too low, or correct. Then it stops.

#include <cstdlib>  
#include <ctime>

#include <iostream>

**using namespace** std;

**int** main() {

**const int** RANGE = 3;

// Seeding random

srand(time(0));

**long** rand = 1 + random() % RANGE;

**int** i;

cout << "Pick The Number Game\n\n";

cout << "Enter a number:\t";

cin >> i;

**if** (i < rand) {

cout << "That hidden number is higher." << endl;

} **else if** ( i > rand) {

cout << "That hidden number is lower." << endl;

} **else** {

cout << "CORRECT!!!" << endl;

}

**return** 0;

}