**The Great Computer Challenge, 2019**

***Object-Oriented Business Programming,***

***Level IV***

# **Background**

**Object-oriented programming** (**OOP**) is a programming standard based on the concept of objects, which can contain data, in the form of fields (often known as *attributes),* and code, in the form of procedures (often known as *methods).* A feature of objects is an object's procedures that can access and often modify the data fields of the object with which they are associated (objects have a notion of “this” or "self"). In OOP, computer programs are designed by making them out of objects that interact with one another OOP languages are diverse, but the most popular ones are class-based, meaning that objects are instances of classes, which also determine their types

Many of the most widely used programming languages (such as C++, Object Pascal, Java, Python, etc.) are multi-paradigm and they support object-oriented programming to a greater or lesser degree, typically in combination with imperative, procedural programming. Significant object-oriented languages include Java, C++, C#, Python, PHP, JavaScript, Ruby, Perl, Object Pascal, Objective-C, Dart, Swift, Scala, Common Lisp, and Smalltalk.

# **Challenge 1: Guess the Number**

Create a game program where the objective is for a player to guess the two-digit random number generated by the program but kept secret from the player.

Write your program to generate a two-digit positive number that’s kept secret from the player. Have the player now guess this number till successful. When the guess is incorrect, have your program tell the player if any of the digits entered are contained in the correct answer. The order of the digits doesn’t affect the number of digits that match. For example, if the correct number is 67 and the player guesses 87, the program will report one matching digit, because the correct answers contains a 7. If the player were to guess 76, the program would report two matching digits. Once the player guesses the correct answer, let the player know how many times it took them to guess the right number. Ensure your program only accepts positive numbers 00 to 99

(20 points)

# **Challenge 2: Typing Tutor**

Typing quickly and correctly is an essential skill for working effectively with cell phones, tablets, and computers. Demonstrate your programming skills by writing a GUI application that can help users learn to “touch type” (type correctly without looking at the keyboard). Your application should display a virtual keyboard similar to what you have on your cell phones and should allow the user to watch what he or she is typing on the screen without looking at the virtual keyboard. As the user presses each key, the program must highlight the correct button on the GUI and add the character to a text area above the virtual keyboard that shows what the user has typed so far. When the key is released, it must reset its original background color. Test your program by typing “The quick brown fox jumped over a lazy dog.”

(35 Points)

# **Challenge 3: Automated Reservation System**

Siri Airlines is a startup airline operating out of Norfolk, Virginia, that offers thrilling rides in a vintage DC-3. It operates three fantasy flights, SA1212 from Norfolk International to Washington DC National, flight SA1216 from Washington DC National to New York LaGuardia, and flight SA1299 from New York LaGuardia back to Norfolk International. The aircraft is configured for 3 rows of first-class seats with 2 seats per row and 7 rows of premium seating with 4 seats per row. They accept reservations up to three days in advance.

Your task is to write a GUI program that allows a passenger to make a reservation and select a seat on one of the three available flights and print the boarding pass. Required information for a passenger to make a reservation is the first and last name, street address, city, state, and a valid telephone number. Available seats are highlighted green in the seating chart while reserved/taken seats are marked in red. Upon successfully seat selection, you are to assign a unique confirmation number. Passengers may choose to printout their boarding pass at this time or later.

The boarding pass must have the airlines name, flight number, day, passenger name, first class or premium seating, seat number, and confirmation number. Should a passenger choose to print the boarding pass later, confirmation #, first, and last name must be required to access the reservation.

For five bonus points, allow passengers to change their flight and seating after initial reservation.

(45 points)

# **Judging Criteria**

Project will be judged on the originality and creativity of the ideas behind the solution, the quality of the design, and the accuracy of the final design to the requirements.

***Have fun and thanks for participating in the   
Great Computer Challenge, 2019!***

# **SOL Correlation**

C/T K-2.4

Plan and apply strategies for gathering information, using a variety of tools and

sources, and reflect on alternate strategies that might lead to greater successes in

future projects.

A. Identify information in various formats.

•Recognize that information may be presented as printed text, electronic

text, audio, video, or images.

B. Identify available sources of information.

•Be able to name and use sources of information available at school and

outside the school.

Thinking Skills, Problem Solving, and Decision Making

C/T K-2.5

Practice reasoning skills when gathering and evaluating data.

A. Recognize that technology can be used to solve problems and make informed

decisions.

•Communicate how a decision was made based on assistance from a

technology tool.

B. Use technology tools to assist with problem solving.

•Demonstrate how technology can be used to investigate and solve

problems in various content areas.

Technology Communication Tools

C/T K-2.6

Communicate effectively with others (e.g., peers, teachers, experts) in

collaborative learning situations.

A. Use technology tools for individual and collaborative writing,

communication, and presentation activities.

•Use word processing to practice writing skills.

•Use common graphic and presentation tools when preparing and providing

presentations.

B. Recognize tools useful for communication.

•Identify how different technologies appeal to different senses.