

Programming Fundamentals with C++

Assignment 1: Roll the dice

1. Description of the task

As the first assignment, you will develop a C++ program where the user will challenge the computer in a dice game. The game involves the user and the computer rolling two dice at a time in three rounds. Whoever gets the highest sum of the dice roll wins the round. Best of three rounds applies, i.e. if someone wins two rounds in a row, the third round does not need to be played. At the beginning of the program, the user must specify how much money he/she wants to bet, 100 SEK, 300 SEK or 500 SEK. If the user wins a bet, the sum of the user's and computer's bet is received, but in case of a loss, the bet is lost.

The following requirements must be met in your application:

- For each round, the dice roll of the user and the computer must be reported.
- It should be clear who won the game in total and for each round.
- Unnecessary rounds should not be played, i.e. if someone wins two rounds in a row.
- The user can play as many times as they want and choose when they want to exit the program.
- If the user succeeds in winning a game, the program must print the current prize as well as the total amount of the prize (if the user has played several times).
- If the computer wins a game, the program should print a consolation message and the total amount of winnings left.
- The user may only deposit a maximum of SEK 5,000 at a time.
- If there is money in the balance, the user does not need to deposit more money for a new game.
- The payment element can be symbolized by e.g. information that its money is deducted from the user's account. Feel free to use an integer that is decreased and increased depending on current wins and losses.
- The dice can be symbolized using a predefined random function, e.g. `rand()`. It returns a random integer. Tip: Use the following code somewhere in your application:

```
- #include <ctime>;  
- srand(time(0));  
- rand() % 6 + 1;
```

In order to solve the above requirements, you need to identify all sub-problems and thus solve hidden assumptions and requirements that are not listed in the task description. In many cases, there is a lot of room for your own interpretation, then you have the opportunity to solve the task in your own best way. However, it is important that you clearly describe the hidden assumptions and requirements that you have identified and solved in your documentation.

2. Documentation

Your solution must be submitted as a report and must consist of two parts, a laboratory report describing the solution and then appendices in the form of source code. The appropriate scope of the laboratory report is 5 - 7 pages (source code and flow charts not included). Write your report according to the report template that can be found under the assignment in Scio. The following should be included in your report:

- Cover page and username (example: a00chrle).
- Problem description and how you solved the assignment.
- Describe your own assumptions and requirements that you have identified in order to solve the task. Also identify hidden requirements and assumptions.
- Describe how you have thought and proceeded to solve the task.
- Flowchart: a rough structure that solves the task's problem.
- Discuss your solution by identifying its strengths and weaknesses.
- Source code that solves the task and follows your flow diagram.
- Comments in the source code that clearly explain the intent of the code.

3. Rules

The assignment forms the basis for the examination in the course and is solved individually. This means that it is very important that the material submitted to the teacher is your own and is easy to identify as your own. Copying text, images, or code is not accepted. However, it is allowed to use source references to show where information comes from and discuss proposed solutions and strategies with teachers and students. But the task must be individually performed according to one's own ability. Group work where source code and written report are created together is not allowed.

4. Deadline

The deadline for assignment 1 is stated in Canvas. The report must be submitted electronically via the learning platform Canvas (instructions are available on the course website). All other forms of submission (e.g. e-mail, printed paper) are not permitted.