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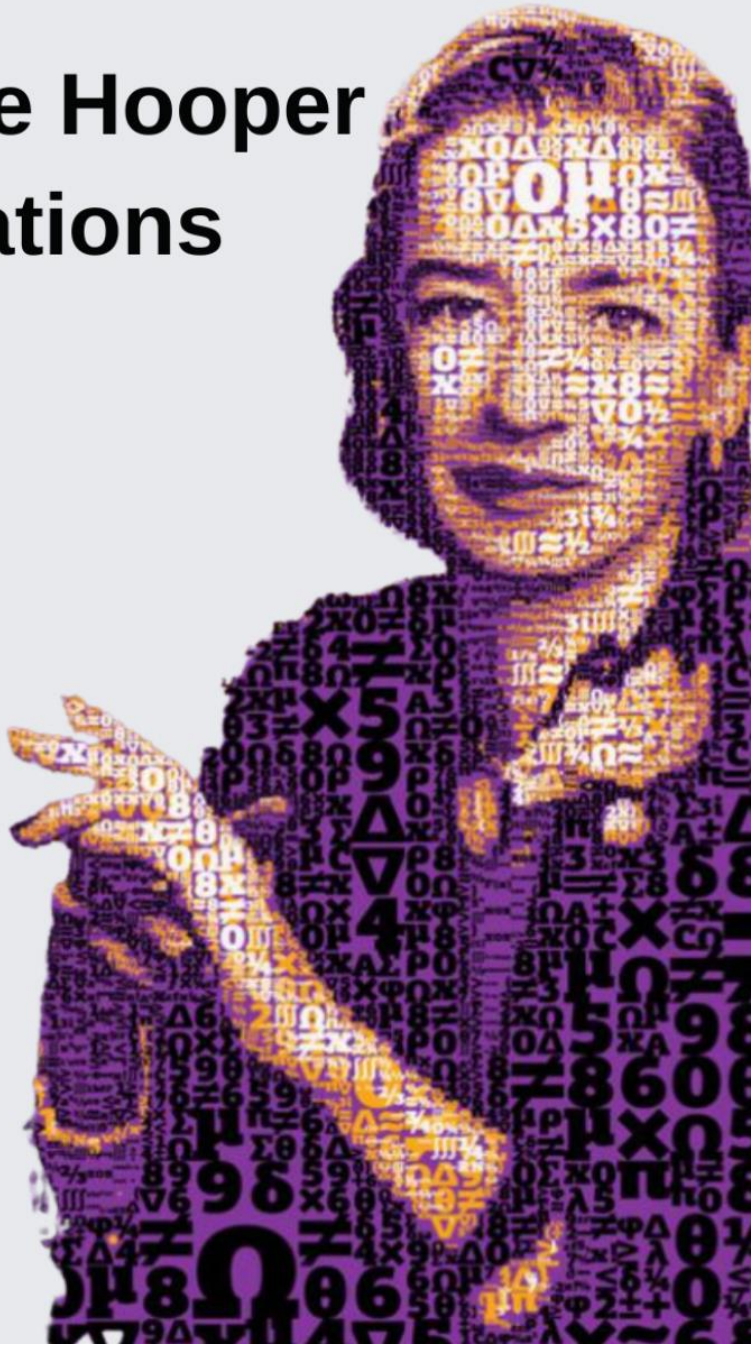
The CodER Youth Organisation's Scenarios Handbook

Title: Grace Hooper Celebrations



Grace Hopper Celebration

Instruction guide

1. Introduction

The targeted audience

i. Age: 10+
ii. Level: Beginner – Medium Difficulty
iii. Group size: 1-4 Persons
iv. Type of target group: young people interested in learning the basics of programming, students and families.

2. The ER scenario

a. Storyline

Grace Hopper was an American mathematics teacher and an officer in the US Navy. She was one of the first women to work with computers and was a leader in software development for most of her life. She developed and improved a compiler and then was among the team members who developed the "Flow-Matic" compiler, the first written in English (rather than the incomprehensible machine language). She later wrote that she "created the compiler because she wanted to free the programmer from routine tasks and bring him back to his work with mathematics". Hopper was honoured by almost every computer-related organisation in the United States for her remarkable contribution, and the President of the United States awarded her the National Medal of Technology.
After her death, the "Grace Hopper Celebration of Women in Computing" was established in her honour, which is considered the most significant technology conference in the world and is exclusively for women in the technology field. This year marks the 30th anniversary of Grace's death, and for the first time, her daughter Mary accepted the invitation to open the conference with a speech dedicated to her mother's work. The conference starts in 1 hour, and Mary Hopper has just alerted you that she cannot give her speech as she has been hacked and the materials she had prepared to present and the speech she wrote have been stolen. You, as scientists in the field of technology and as organisers of the conference, take it upon yourselves to get into Mary's computer to restore the stolen files so that the conference can take place usually.

b. The objective of the game

The hackers emailed Mary asking her to cancel the conference or give them $100,000 to return the files before the conference started. They also sent her an encrypted file that she described as useless. You have encountered such a file before after being confronted by

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these hackers, and you know that if you can follow the clues in it, you will recover the material for Mary's speech.

1. **Creating the setting**
    a. **Needed materials/equipment for each table**

Provided:

- A Folder containing several "encrypted" files
- A Locked Folder containing Mary's speech

Not provided:

- Personal Computer

b. Setup of the table/ room

- The computer/laptop is to be placed on the desk with a power supply
- A notebook along with a pen for notes
- Suggest that the space chosen to place the game should be an office space since Mary prepared the speech on her desk, where she received the email from the hackers.

c. Installation and reset

- You need to download from the website the set of files available for the specific game and place them on the computer's desktop that will be used for the game.
- For the game to be played by a new team, we need to close all open files on the computer and ensure that all the material downloaded from the website is on the desktop.

d. To have in mind

- Before a team plays, ensure all files available on the page have been downloaded to the computer, there is enough battery on the laptop, and provide a notebook and pen to the team. The game cannot be completed if any files are removed from the folder.

2. **The game**
    a. **The game master**

The GM has a vital role in the game; first, he has to explain to the team what the game they are about to play is and then inform them of the theme, story, and goal they have. He must ensure the team understands their purpose and that they only have 1 hour to unlock the Mary file folder, or the conference will be cancelled. He will then brief them on the items that are part of the game and begin the one hour they must escape. During the game, he

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needs to focus on the game to identify any mistakes the team will make and where they have questions so he can correct/help them.

b. Hints

The GM needs to know the players' steps to solve the mystery. He must know exactly what clues the players have available and, how each puzzle is solved, the actions they must perform to get the correct result from each puzzle. He needs to understand where they are and if he feels they are behind in time to give the appropriate hints to move on to the next step. Finally, he must know the results of each puzzle and the final code to be used to retrieve the files so that if a mistake is made, he can correct them.

c. Game stages

i. **Puzzle 1**: The first puzzle is the GRACE file which contains several times some letters. These letters form the name of Grace, and they have to count how many times each letter is in the file. G=8 R=6 A=5 C=4 E=9.

1. **Hint 1**: The file name can help you find what you want.
2. **Hint 2**: There are 8 Gs in the file.
3. **Hint 3**: Count how many times you have each letter from Grace's name. G=8 R=6 A=5 C=4 E=9.

Solution: 86549

ii. **Puzzle 2**: The second puzzle is the C Program file, where there is an example of the use of the for loop at the beginning. The team from the example must understand that in each execution of the for loop, the variable i is incremented by one since there is the command i++, but this increment is done at the end of the for loop; this is the key to the correct solution of the puzzle. The second page is the code the team must execute to get the code. Each iteration of the loop multiplies the variable number by the variable I, replaces the variable number with the result of the operation, and then prints it.

1. **Hint 1**: It increases after the end of each iteration.
2. **Hint 2**: In the first iteration, number=2 i=1, do the operation number=2 again, print 2, and it increases by one.
3. **Hint 3**: Repeat until it becomes 5 and the condition i<5 does not hold

Solution: **241248**

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iii. **Puzzle 3**: The third puzzle is the Java Program file where at the beginning, there is an example for the use of %; the team from the example must understand that % is the remainder of the division, i.e., in the example 5/2=2 and the rest is 1, this is the key to the correct solution of the puzzle. The second page is the code the team must execute to get the code. Initially, the variables x=5 and y=2 and z are the remainder of the x/y division. In each iteration of the while, as long as z does not equal 5, the variable x is multiplied by 3, y is multiplied by 2, and the remainder of the x/y division is calculated, which equals the variable z. Once the rest of the x/y operation is completed, the variable z becomes equal to 5, the while stops, and the xyz is printed.

1. **Hint 1**: The % is the remainder of the division, i.e., in this example, 5/2=2, leaving a rest of 1.
2. **Hint 2**: In the first iteration, x=15 y=4, calculate the remainder z=3 since z! =5 the while will continue to run.
3. **Hint 3**: Repeat until z becomes 5 and the condition z! =5 does not hold. (In the last iteration, x=45, y=8, and z=5)

Solution: **4585**

iv. **Puzzle 4**: The fourth puzzle is the Contacts file, where in the file, you show a phone with 5 outgoing calls and the phone's keypad. This puzzle's essential elements are the calls made and the keypad. There are some letters under each number on the keypad; on the old technology phones, if you wanted, for example, the letter S you had to press 4 times the number 7. If you follow this logic, each call made corresponds to a number, 5 calls, so 5 numbers.

1. **Hint 1**: Under each number on the keyboard, there are some letters.
2. **Hint 2**: On old technology phones, if you wanted the letter S, for example, you had to press the number 7 4 times.
3. **Hint 3**: 333=F 444=I 888=V 33=E, so the first number is Five = 5.

Solution: 59746

v. **Puzzle 5**: The fifth puzzle is the file R=43 which contains a table of letters and some rows of numbers. The most crucial thing in this puzzle is to notice the file's name, which is the main clue to solving

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the puzzle. R=43 identifies the position of R in the table; R is found in the table's 4th row and 3rd column. If you follow this logic, each row corresponds to a number, 4 rows, so 4 digits.

1. **Hint 1**: The file name can help you find what you want.
2. **Hint 2**: R=43 identifies the location of R in the table; R is found in row 4 and column 3 of the table.
3. **Hint 3**: 55=Z 15=E 43=R 35=O so the first number is Zero = 0

Solution: 0364

vi. **Puzzle 6**: The sixth puzzle is the HMM file; there are 5 clocks, but one has no hands. The team has to calculate the time difference between each clock (42 minutes) and, with this logic, find the time indicated by the 5th clock. The file's name is HMM, i.e., Hours Minutes, to identify the code format to the team.

1. **Hint 1**: There is a pattern in the time that each clock shows.
2. **Hint 2**: The time difference between each clock (42 minutes) must be calculated to find the time shown by the 5th clock.
3. **Hint 3**: The file name is HMM, i.e., Hours Minutes, to identify the code format for the group. (The 4th clock shows the time 4:37; if we add 42 minutes, the 5th clock should show the time 5:19)

Solution: 519

vii. **Final Password**: The last password is the file key to the speech. After solving all 6 puzzles, the team must open Mary's Files file, which will ask for a code. The code consists of 6 pieces, i.e., the answers to the 6 puzzles. Inside the file is the order in which the codes must be entered and the code format. The order is as the puzzles are written above, i.e. GRACE, C Program, Java Program, Contacts, R=43, HMM and in between each code, there must be a dot (without spaces) if the group cannot understand the form of the code the GM must point out the order and tell them that in between the result of each puzzle, there is a dot The code to unlock Mary's Files file is: **86549.241248.4585.59746.0364.519**

1. **In case of success**: if the team manages to solve all the puzzles and find the final code, they will unlock the folder

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with the files prepared by Mary, and the conference will be a success.

2. **In case of failure**: if the team does not solve all the puzzles to find the final code in the allotted time, they will not be able to retrieve the folder with the files prepared by Mary, and the conference will be cancelled.

Whatever the final result, the GM must explain any questions about the game and puzzle-solving to the team.

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