

**Bob 1**

## Mission 3 : QKD-encrypted Message

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*50 minutes of gameplay [60/200 points]*

Blah blah storyline. **The goal of this mission is to receive and decrypt QKD-encrypted messages from Alice.**

This mission is divided into smaller tasks, which consists of compulsory and optional tasks. The compulsory tasks are marked with either [Checkpoint], [Final Task], or [Secret Task] flags, while the unmarked tasks are sort of optional. It is thus a priority to complete all the flagged tasks before the optional tasks, as one will not be able to revisit these tasks after the deadline. The compulsory tasks are very important for the upcoming missions. It is also highly advisable to split the tasks among your teammates.

### [10 points] [Checkpoint] Establish the secure key

*Blah blah blah*

- xxx

Objective: Establish 32-bit secure keys by running an automated script.

Point allocation scheme:

- [Full] points upon completion of the objective

Step by step walkthrough:

1. Connect both classical device (from Mission 1) and quantum device (from Mission 2) to the same computer. Remember to enter the correct device addresses in `devloc_classical.txt` and `devloc_quantum.txt`.
2. Run the program `send_32bitQKD.py` (for Alice) and `recv_32bitQKD.py` (for Bob). Note that Bob needs to run his program first.
3. Patiently wait. The key should be ready in about 2 to 3 minutes, if everything works out smoothly.

### [10 points] Message encryption handout

*Blah blah blah*

- xxx

Objective: Complete the `Message Encryption` handout. No cheating or copying with Bob

allowed [insert stern warning].

Point allocation scheme:

- Based on the number of correct responses in the handout.

Note: Only do this when there is a free time or there is a member in your group who happens to be free.

## [10 points] Our setup handout

*Blah blah blah*

- xxx

Objective: Complete the `Our Setup, Bandwidth` handout. No cheating or copying with Bob allowed [insert stern warning].

Point allocation scheme:

- Based on the number of correct responses in the handout.

Note: Only do this when there is a free time or there is a member in your group who happens to be free.

## [20 points] [Final Task] Send encrypted message

*Blah blah blah*

- xxx

Objective: By using the secret key obtained earlier, correctly decrypt the encrypted text sent by Alice. Note that you should not say the key or the message out loud, unless if being explicitly asked by `GameMaster`.

Point allocation scheme:

- [Full] points upon completion of the objective
- [20%] of total points reduction if any of the team member says either the keys or messages outloud, and can be heard by the `GameMaster`

Step by step walkthrough:

1. Alice runs `encrypt.py` to encrypt the message by using the established secure key.
2. Alice and Bob then both opens `chatting.py`, and Bob sets it on the listening mode. Alice then sends the encrypted text via the classical channel.

3. Bob then decrypt the received encrypted text by using `decrypt.py`.
4. If Bob thinks that he has obtained the correct message, he informs the `GameMaster`, and the `GameMaster` will check the correctness of the message with Alice.

### ***Performed in the last 15 minutes of the session***

## **[10 points] [Secret Task] Super secret messages, part 2**

*Blah blah blah*

There will be a few encrypted texts that you receive from Alice. You need to decrypt these texts and write the secret messages on the document given by the `GameMaster`. You have to **ensure the security of the content**, and that you **seal** the document and **return** it to the `GameMaster` after the conclusion of the mission. Listen to the explicit instructions from the `GameMaster` on when to receive each messages.

Objective: Bob successfully receives and decrypts all the messages from Alice.

Note: You must not communicate with Alice (no talking or signalling), except by using the softwares provided.

Point allocation scheme:

- [Full] points if all the messages is sent by Alice and received successfully by Bob, or
- A fraction of [full] points, proportional to the number of messages sent and received successfully.
- Some points will be forfeited if Bob communicates with Alice in any way besides through the softwares.