IOI 2021 Screen Recording Procedures

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Overview

This write-up provides instructions for recording the Contestant PC's full desktop screen, and uploading of the recording to the HTC. The command line tool FFmpeg is used for recording, producing a video file in MP4 or MKV format.

Installing FFmpeg

This section describes how to install and use FFmpeg for recording your computer screen. This command-line tool can be easily configured to produce a video recording file in MP4 or MKV formats, both of which are sufficiently compressed for the purpose of proctoring.
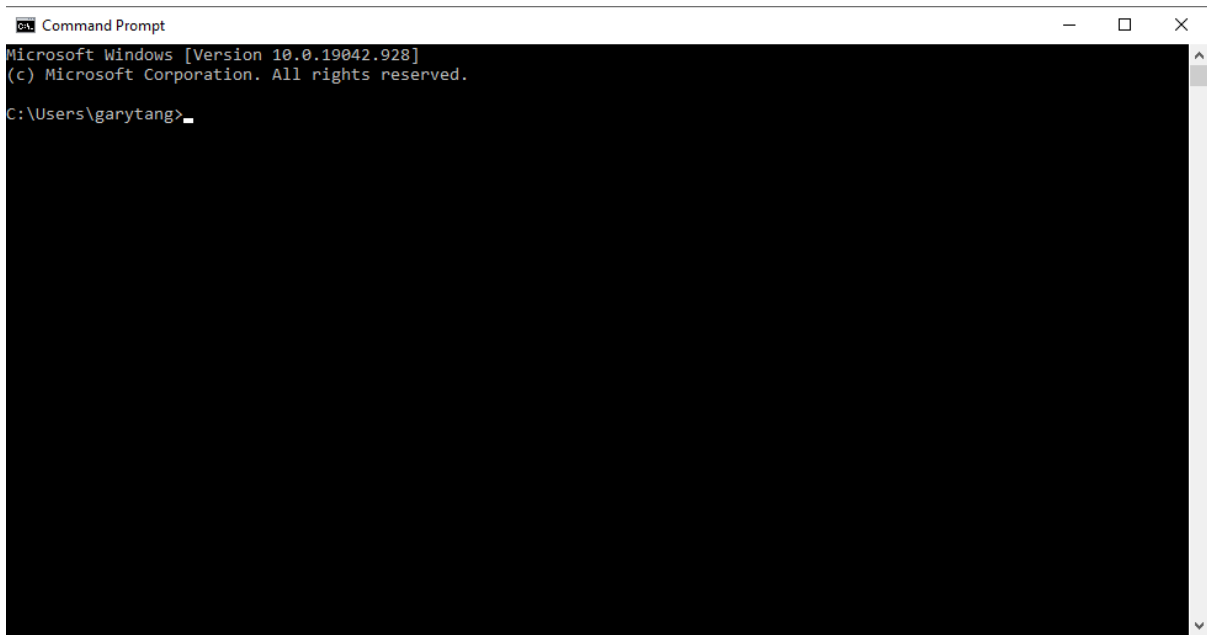
In this document, we shall use MP4 as the chosen format for subsequent examples mentioned here. This document also provides instructions for Windows 10 host PCs only.

You should name the output file for storing the video recording using your IOI contestant code and day of competition, in the format "`<contestant code>-<day of competition>.<mp4 or mkv>`" (e.g., `SGP1-1.mp4` or `SGP1-1.mkv` for Singapore Contestant 1, on Day 1 of competition, saved to either MP4 or MKV format). For recordings on Practice Day, it will be known as Day 0 (e.g., `SGP1-0.mp4`)

To install FFmpeg, download the installation zip file on your PC from https://www.gyan.dev/ffmpeg/builds/ffmpeg-release-essentials.zip. Click on the downloaded zip file to extract its contents to a directory of your choice. If you have extracted it to the home directory of your PC under your username, the extracted directory will be named "`C:\Users\<your username>\ffmpeg-4.4-essentials_build`". In this example, if your computer's username is "`garytang`", the extracted directory will be "`C:\Users\garytang\ffmpeg-4.4-essentials_build`". For convenience, you may want to rename the installation directory to simply "`C:\Users\garytang\ffmpeg`".

Using FFmpeg

1. To use FFmpeg, you will first need to start the command prompt by pressing the Windows Menu (`Win`) and `R` keys together to open the Run dialog, followed by typing "`cmd`" and pressing Enter key. The command prompt will look something like this:
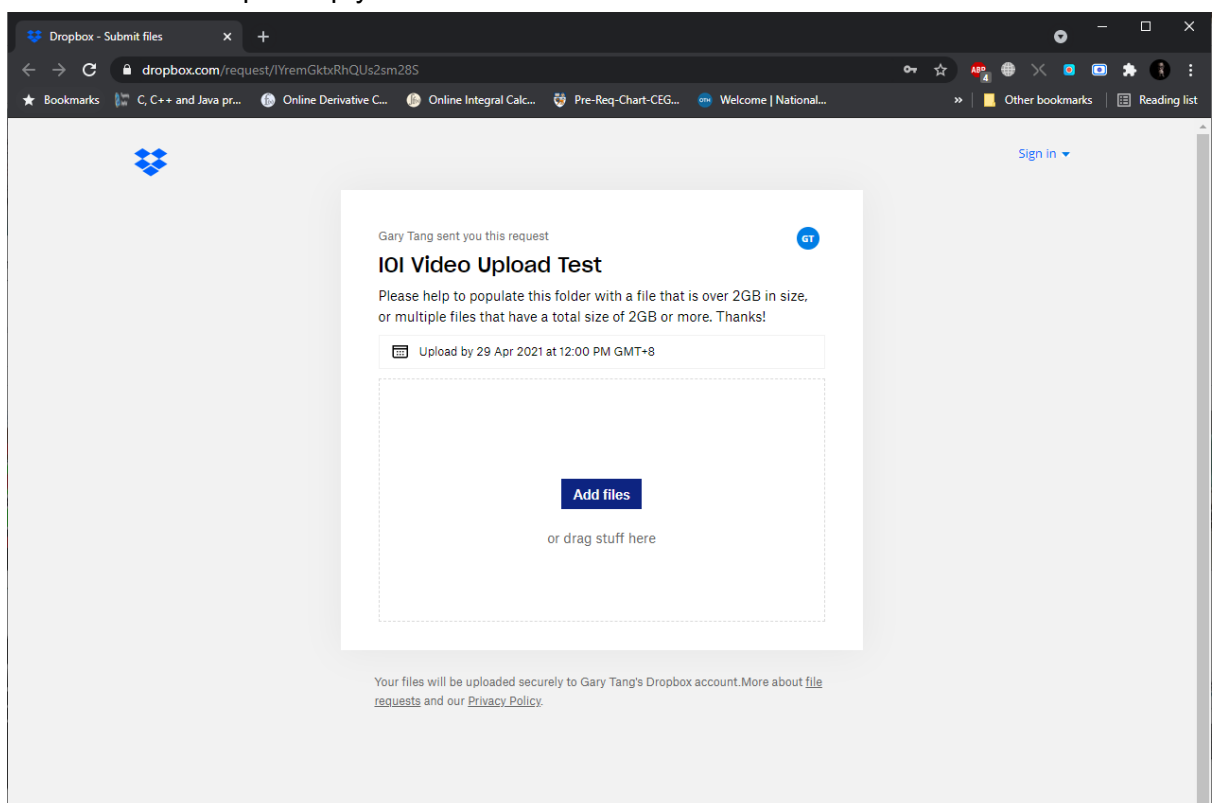
    a. The default directory for storing video recordings is the Videos file directory of your PC (`C:\Users\<your username>\Videos`). To store videos in that folder, type the output of your video's directory as "`C:/Users/<username>/Videos/<video name>.mp4`".

2. To start the recording of your computer screen, type the following single-line command on the command prompt and press Enter, taking note of the contestant ID and day of recording which varies. The command assumes that your FFmpeg installation directory is "`C:\Users\<username>\ffmpeg`".

```
C:/Users/<username>/ffmpeg/bin/ffmpeg -f gdigrab -r 2
-probesize 40M -threads 1 -i desktop -vcodec libx264 -b:v 256k
-pix_fmt yuv420p C:/Users/<username>/Videos/SGP1-1.mp4
```

3. To stop the recording of your computer screen, switch to the command prompt application and press the Q key.

    a. (Optional) To play the recording, simply double-click the video that you have recorded to begin. Otherwise, on the command prompt window, you can use the ffplay player by entering "`C:/Users/<username>/ffmpeg/bin/ffplay C:/Users/<username>/Videos/SGP1-1.mp4`" on it. To stop the ffplay player, press the Q key.
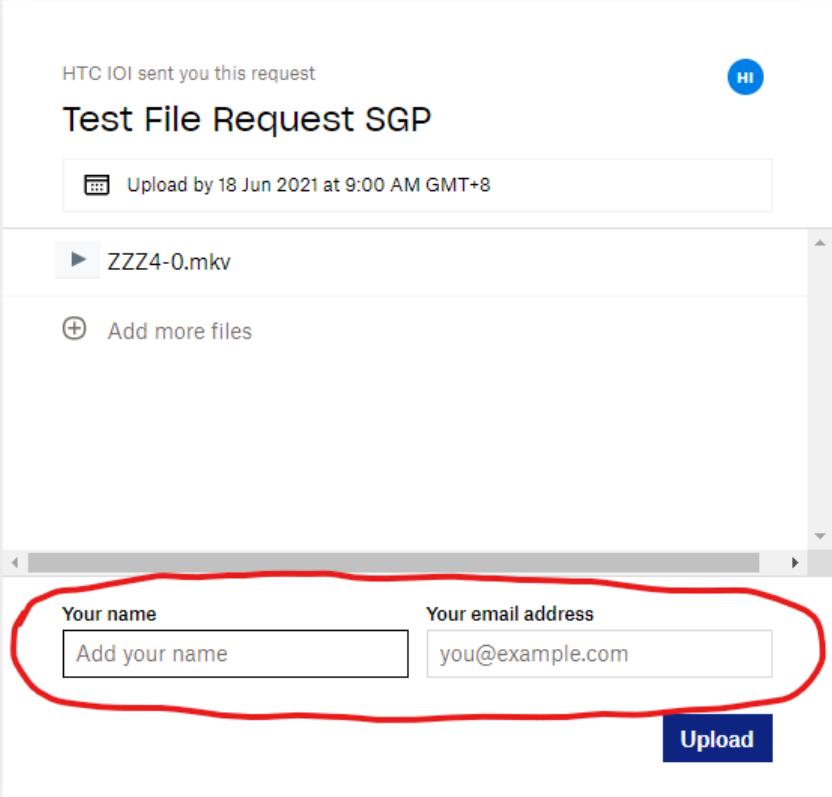
Uploading video files for contestants

1. On the practice day, Day 1 and 2 of IOI 2021 competition, a Dropbox File Request Link to an upload folder will be available to each Team 24 hours in advance, in the form of "`https://www.dropbox.com/request/<folder string>`". Each Team will receive a unique link that Team/Deputy Leaders (TLs/DLs) are to retrieve from Matrix chat, for each day of competition.
    a. To request for this link, TLs/DLs should use our Matrix Chat Bot (`@ioibot:chat.ioi2021.sg`) and simply type "`dropbox`". You may also use this command to check whether contestants have uploaded their files.
    b. The link that the bot gives works for only that Team. For example, if the SGP TL requests for it, he will get the File Request Link which is for Team SGP only.
    c. The link also works for a specific day of competition itself only. Teams will get one link for their team for the Practice Day, another for Day 1 of the competition, and the last one for Day 2 of the competition. The links have deadlines, which is explained in point 4 below.
2. You will then be greeted by a Dropbox folder request that looks like this when you click the link that opens up your Internet browser:

3. TLs/DLs/Contestants can then proceed to upload their contestant's screen recording video files, via drag-and-drop or clicking to add files to be uploaded.
    a. We recommend selecting multiple files to upload at the same time for your convenience, if applicable.
    b. During the upload, please DO NOT close your browser's window!
4. Folders will remain active for 24 hours after the end of the practice day, Day 1 and 2 of IOI 2021 respectively. Following which, the folder will close and the Dropbox link

will become nullified. Therefore, Teams MUST upload the videos into the folders before the deadline. Late submissions will not be accepted.

5. Please adhere to the naming format for each video as well (`<contestant code><dash><day of competition>.mp4` (e.g., `SGP1-1.mp4` for Singapore Contestant 1, on Day 1 of competition).

6. After dragging your video file or selecting from "Add files", you will be asked for your name and email address if you are not signed in to a Dropbox account. Please provide your full name and email address as required, as shown:

    a. If you are signed in to a Dropbox account, you may choose to upload your file straight away unless the account that you are using is not your personal Dropbox account. In this case, you are either required to sign in to another Dropbox account (which is your personal one), or sign out from Dropbox completely before clicking on your Team's File Request link.

What to do if FFmpeg suddenly crashes

1. If a Contestant PC crashes for any reason while FFmpeg is running, TLs/DLs are to immediately notify HTC and inform them of the incident via the `ioi.contestops` chatroom. They are to also inform the HTC if they are changing the host PC for their contestants as well.

2. After the Contestant PC is rebooted, Team/Deputy Leaders must ensure to restart FFmpeg and create a new screen recording before Contestant resumes work. The new video will be in the format of "`<contestant code><dash><day of competition><dash><timestamp>.mp4`" (e.g., `SGP1-1-2000.mp4` for Singapore Contestant 1, on Day 1 of competition, with the timestamp at 8pm).
    a. The timestamp is the timing when contestants restart their screen recording, as soon as the PC is back in working order.
    b. The timestamp is in HHMM, 24-hour format, GMT +8. Do note this if your timezone is different.
3. Contestants must restart FFmpeg and create this new screen recording whether or not the old one is corrupted. However, when the signal is given by the HTC to commence uploading, please upload both the original file and the new one to your Team's File Request Link, before it closes.
4. TLs/DLs should also not hesitate to seek support from the HTC via the `ioi.support` chatroom for further assistance if necessary.
5. There is currently no known way to detect whether FFmpeg is running smoothly or has crashed, not at least without taking over a contestant's PC to switch out of the VM and into Windows to see the CMD window that is running FFmpeg. Thus, TLs/DLs are to make their own arrangements to periodically check their contestants' PCs to see the status of the FFmpeg recording.
    a. There is no need to inform the HTC when such checks are performed, but TLs/DLs must immediately notify the HTC if they detect a crash (i.e., when performing the restart. Refer to point 1).