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A Telegram bot for printing LaTeX files

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Introduction

- I present a proof of concept of a Telegram bot, meant to run on the Raspberry Pi.
- The purpose of this bot is to accept (La)TeX files submitted by a user running the Telegram client on a mobile phone or on a PC/Laptop browser, and to send back a PDF file produced by compiling the (La)TeX files using pdftex or xetex

Genesis of the idea

- From a brainstorming session between us over various uses that could be made of the Raspberry Pi
- My co-author asked if people could run TeX on the Raspberry Pi… Well, people were already running it.
- We hit upon a use case for the Raspberry Pi: People could type up a TeX file on their mobile phone, send it to server software running on the Pi which would compile the TeX file into Postscript or PDF and print it out
- The person who had submitted the Tex file could then come and collect the typeset and printed output of that Tex file
- This service could be a paid service

The learning process and obstacles

- **TeX files via SMS.** But, there are restrictions in India on how many SMS messages can be sent by and to a particular number, also on what sort of attachments can be sent by SMS, and on their size. And SMS costs money.
- **Messaging software like WhatsApp and Viber**. Involves a python library named Yowsup which uses a reverse engineered API for WhatsApp, named Chat API, which WhatsApp considers to be a violation of its terms of service, and warns of grave consequences.
- **Telegram**. The same online article that warned us about WhatsApp led us to Telegram.

Telegram APIs

- An API to write a full-fledged Telegram client
- Another API allows one to write a bot for Telegram
- There is third way: a command line desktop/laptop Telegram client

  For reasons of simplicity and expediency, we chose the bot approach, also for the reason that the command line reference examples were in Lua and the bot examples in Python which I am more familiar with

- A command line implementation in the future is not ruled out

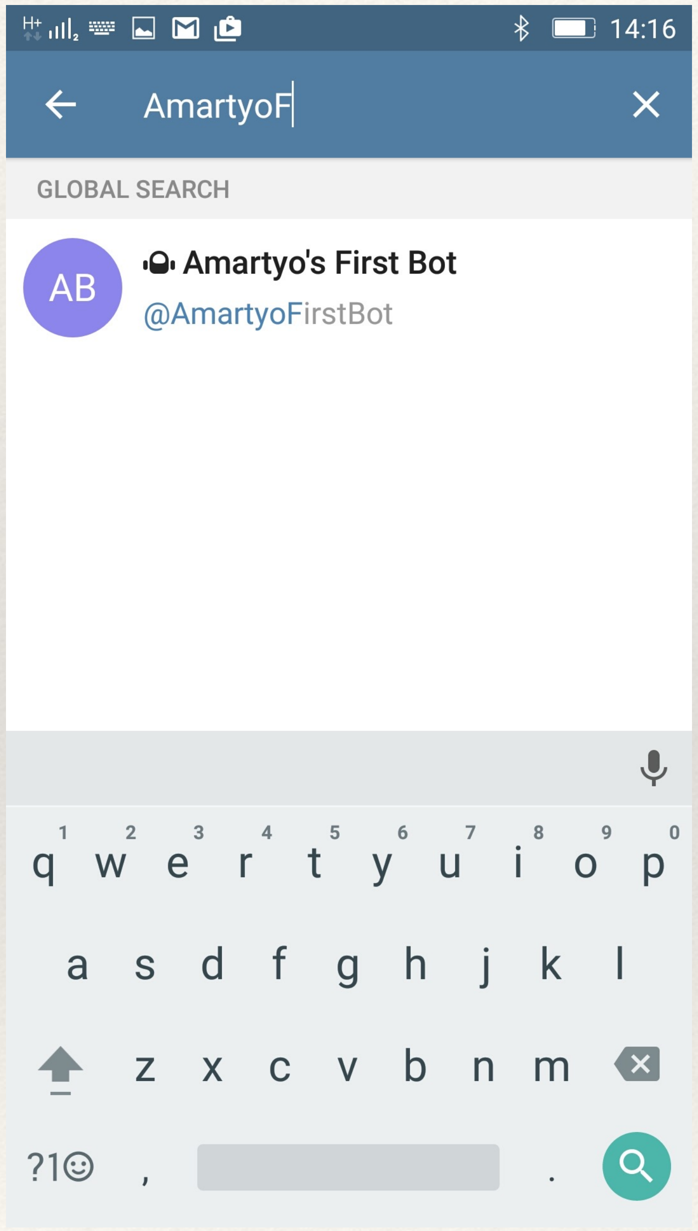
Telegram APIs and file size limitations

- File size in the bot implementation is now limited to 20MB
- This can be reached quickly if the user references figures and graphics files in the (La)TeX files, for inclusion in the final typeset Postscript/PDF file
- In this scenario, the command line implementation assumes significance
- For now, we have the bot

Initial implementation and workarounds

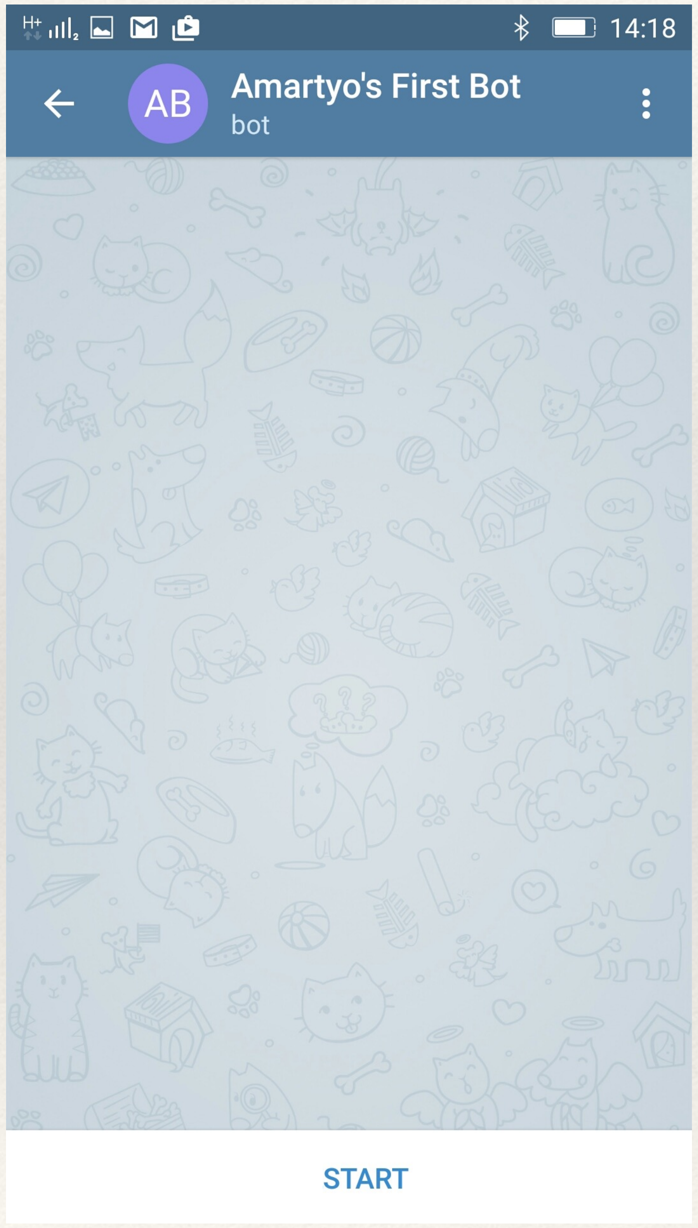
- Understanding the examples known as Telepot, and the Telegram API
- The function given in Telepot for downloading did not work
- The code would hang at that point, until one was forced to kill the bot.
- I coded an initial workaround with wget to directly download the file from the Telegram servers.
- Later I developed a patch for the teleport source files, and so download works now as it should.
- The patch itself is trivial although the effort to figure out what to do was not. We will submit it to the author of telepot soon.

User experience and implementation



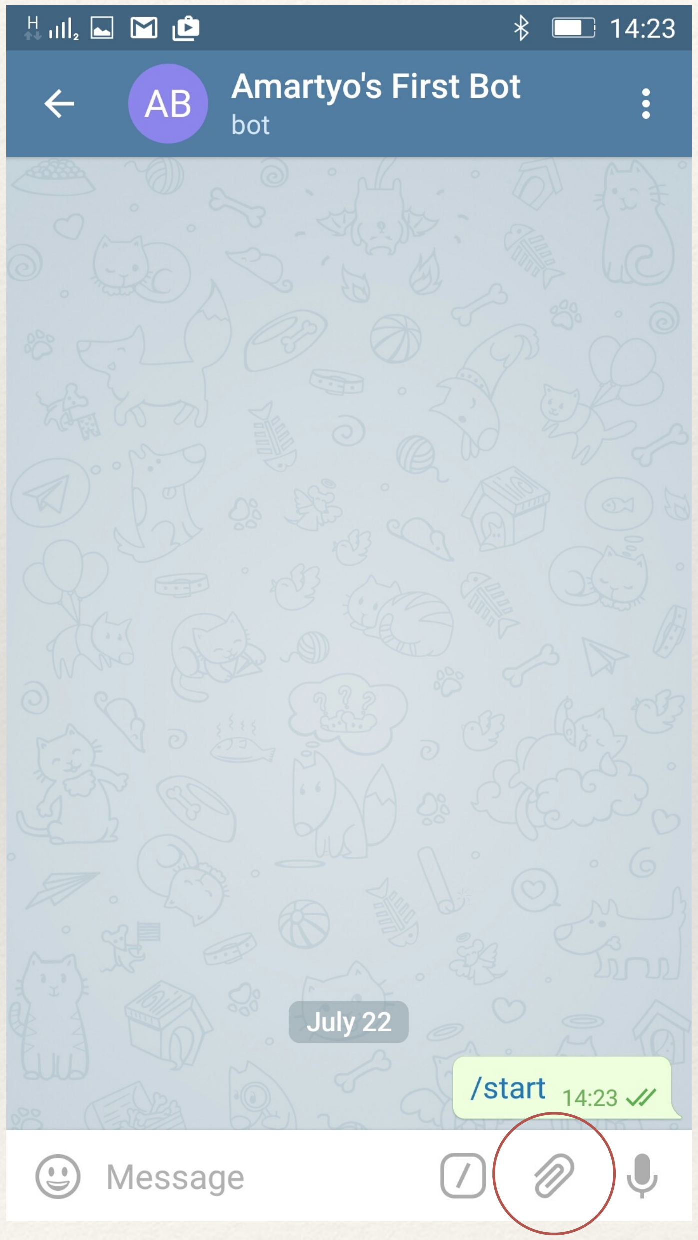
- The user installs the Telegram client on a smartphone
  - For this, the user registers and provides the mobile number for verification
  - Post registration, user searches for AmartyoFirstBot

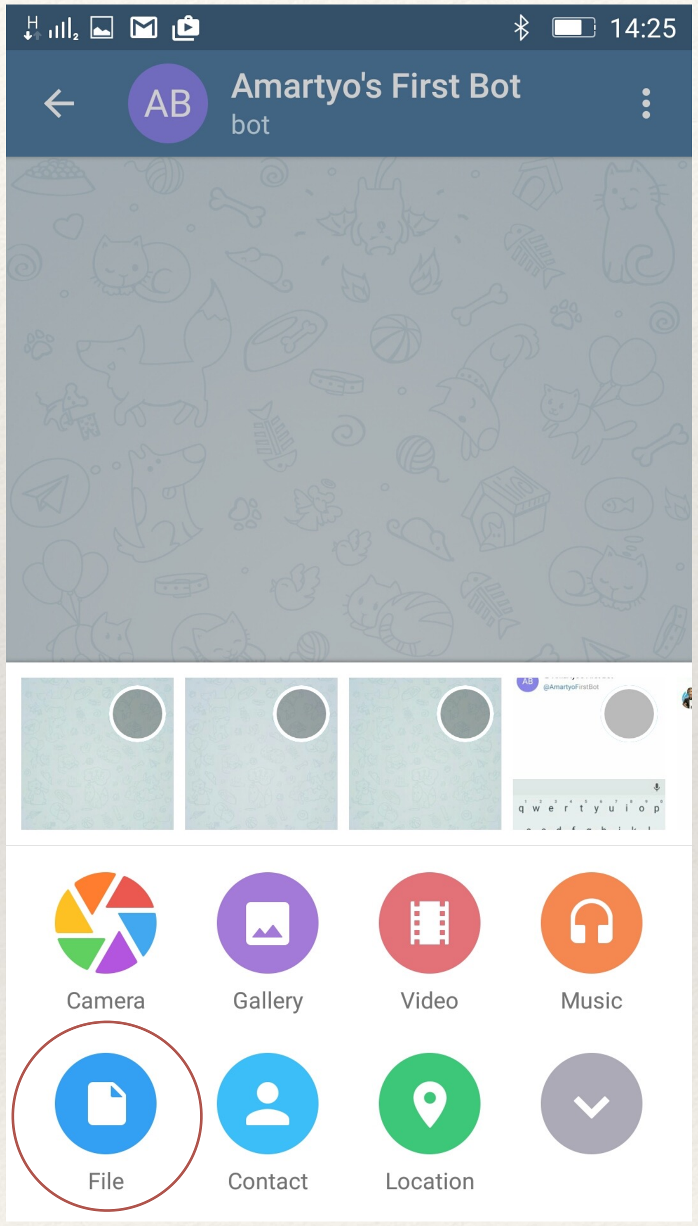
User experience and implementation

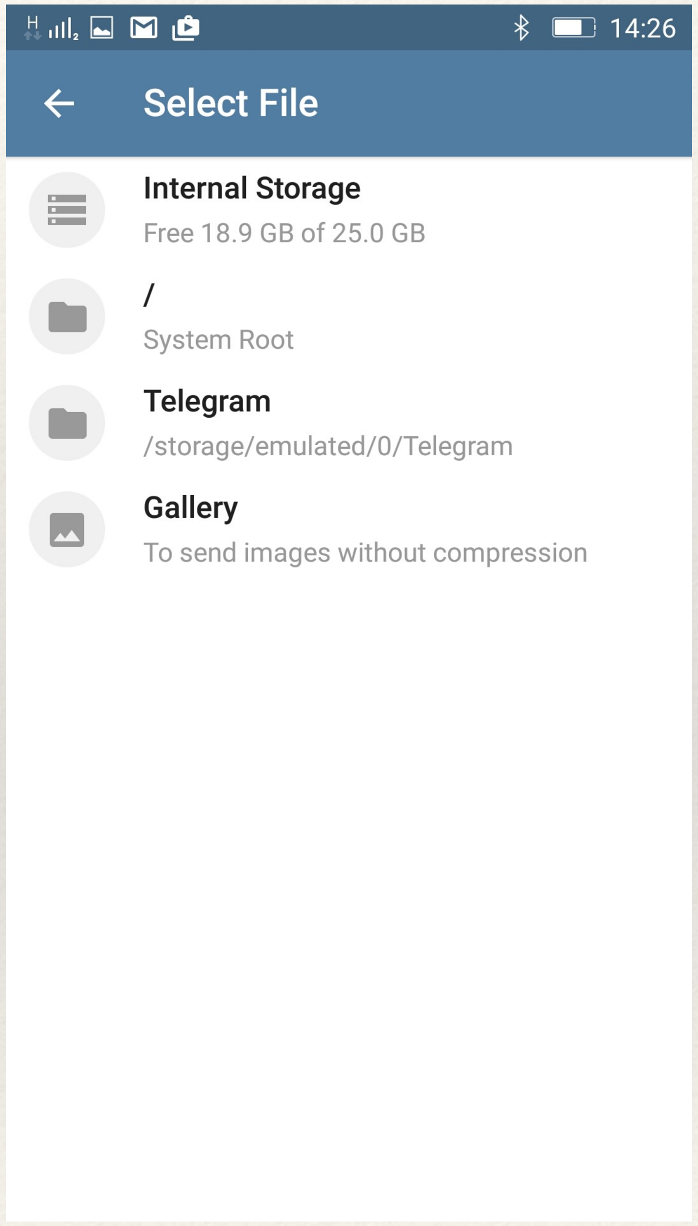


- On selecting the search result, user pushes a Start button that serves up a Chat session

User experience and implementation

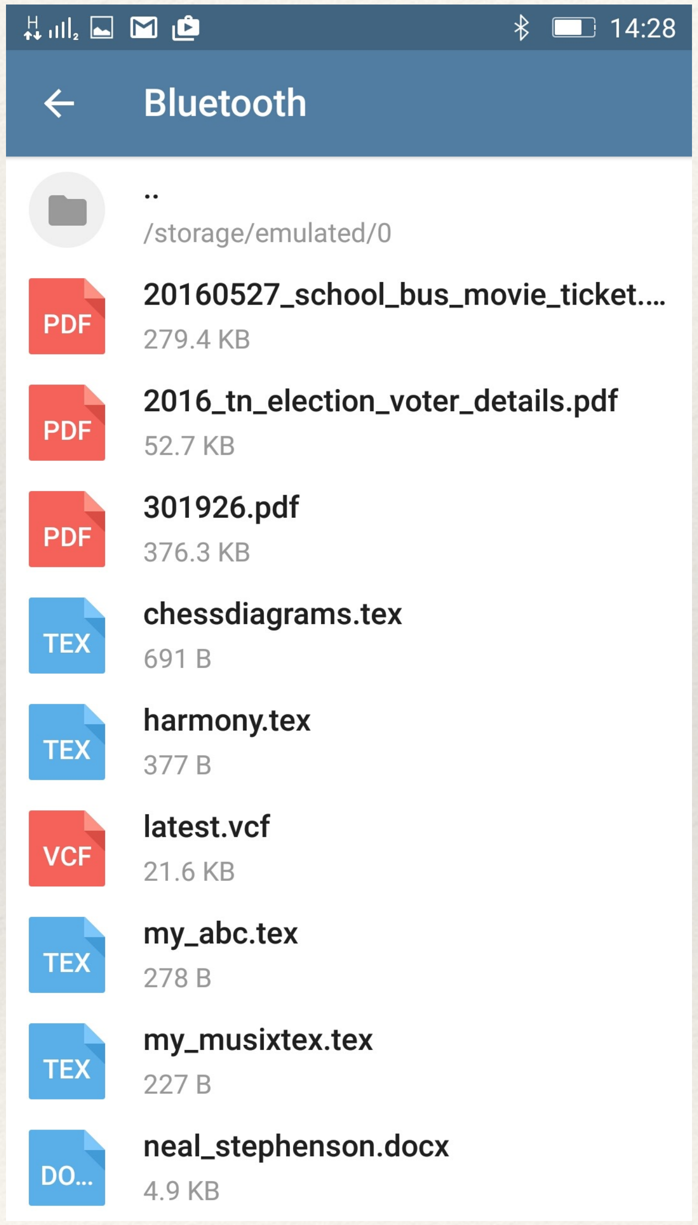






The Chat widget serves an attach icon, the user goes to the file browser…

User experience and implementation


14:28

Bluetooth

..
/storage/emulated/0

PDF 20160527_school_bus_movie_ticket....
279.4 KB

PDF 2016_tn_election_voter_details.pdf
52.7 KB

PDF 301926.pdf
376.3 KB

TEX chessdiagrams.tex
691 B

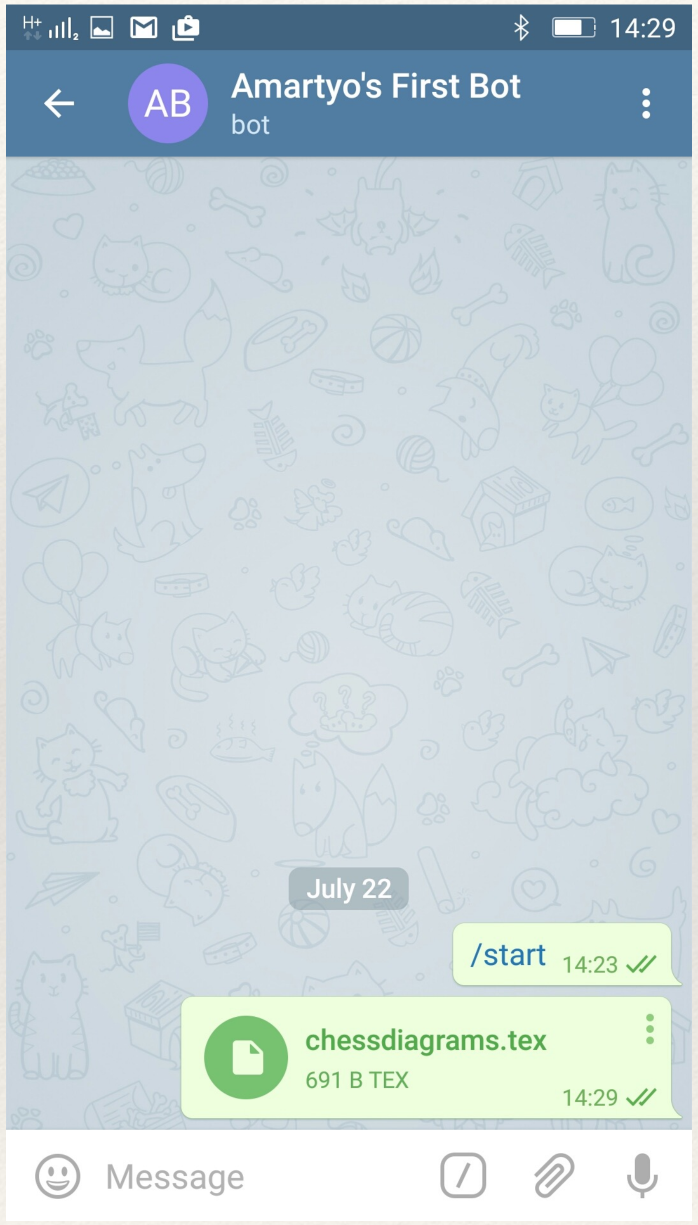
TEX harmony.tex
377 B

VCF latest.vcf
21.6 KB

TEX my_abc.tex
278 B

TEX my_musixtex.tex
227 B

DO... neal_stephenson.docx
4.9 KB


14:29

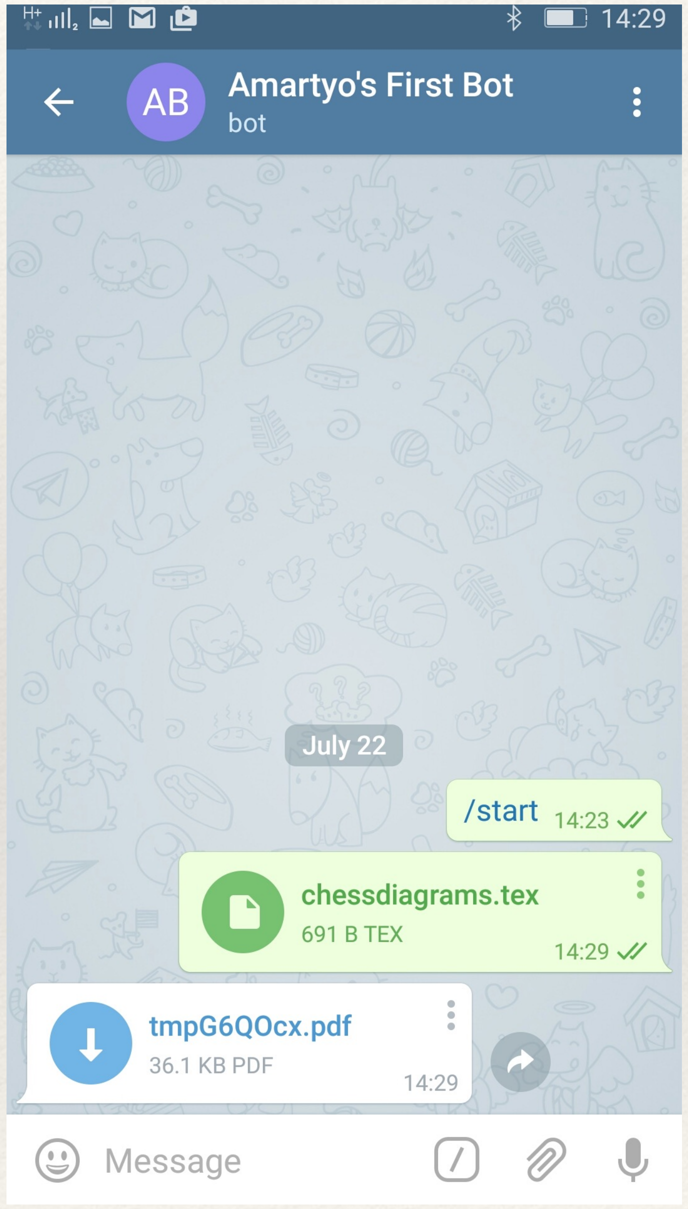
AB Amartyo's First Bot
bot

July 22

/start 14:23

chessdiagrams.tex
691 B TEX 14:29

Message


14:29

AB Amartyo's First Bot
bot

July 22

/start 14:23

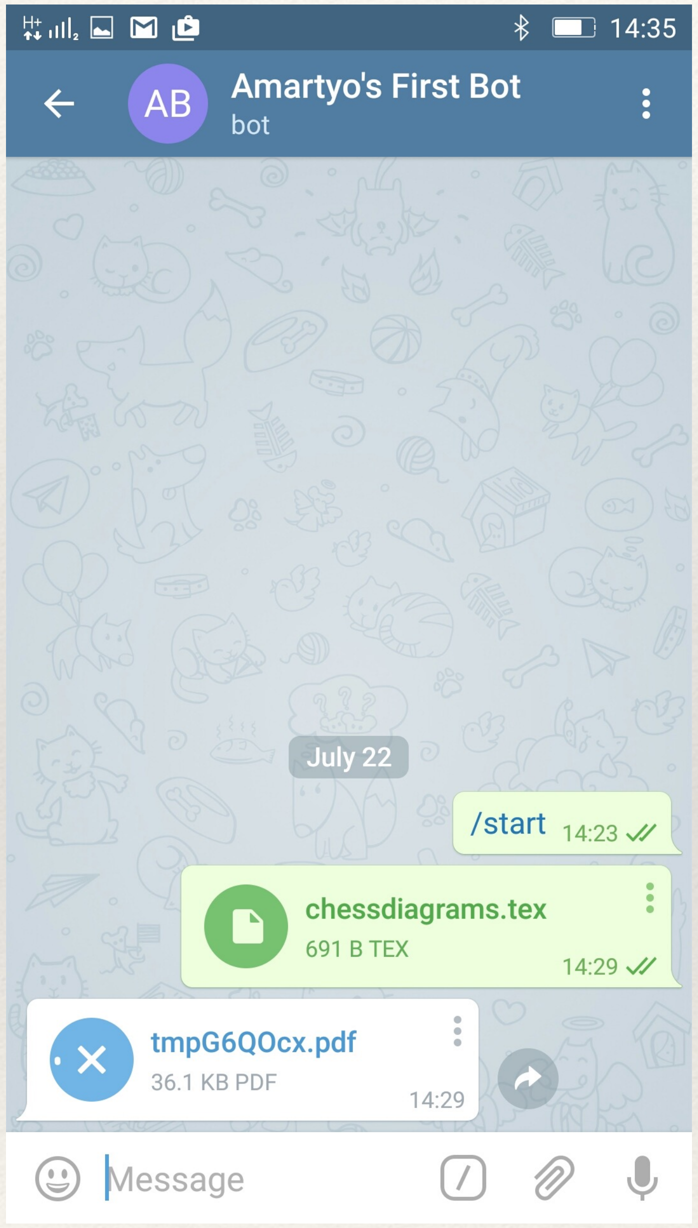
chessdiagrams.tex
691 B TEX 14:29

tmpG6QOcx.pdf
36.1 KB PDF 14:29

Message

… and picks a LaTeX file and sends it to the server.
The user then receives the LaTeX as pdf…

User experience and implementation



/start 14:23

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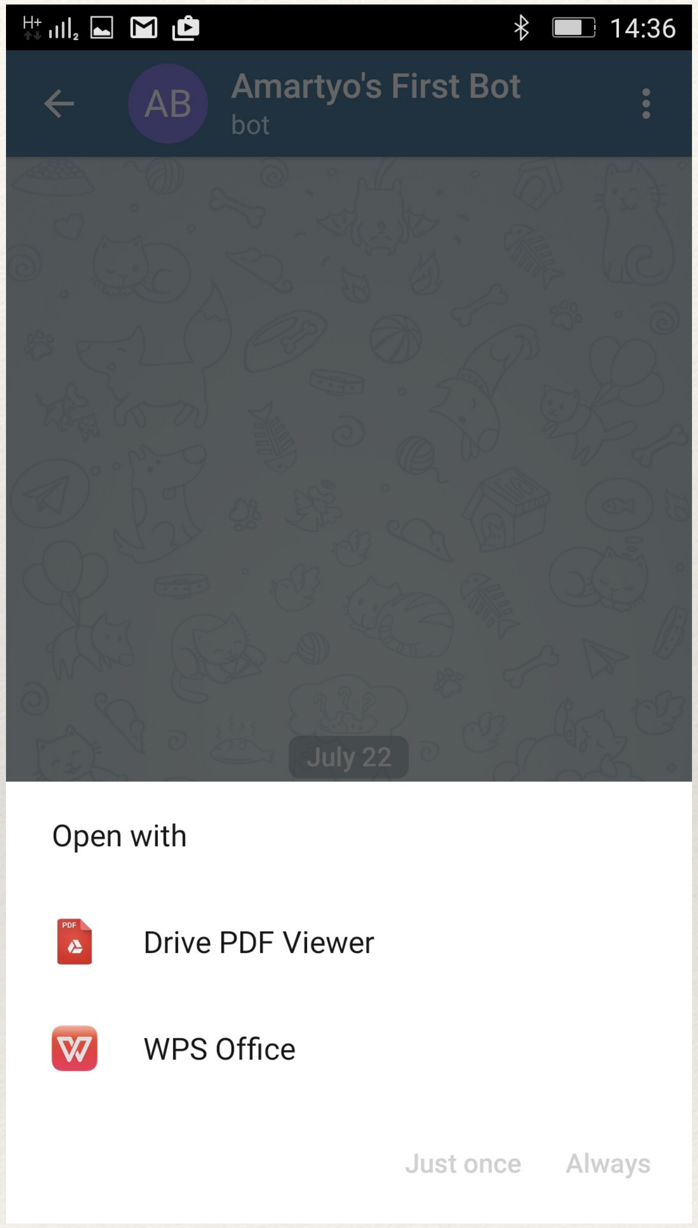
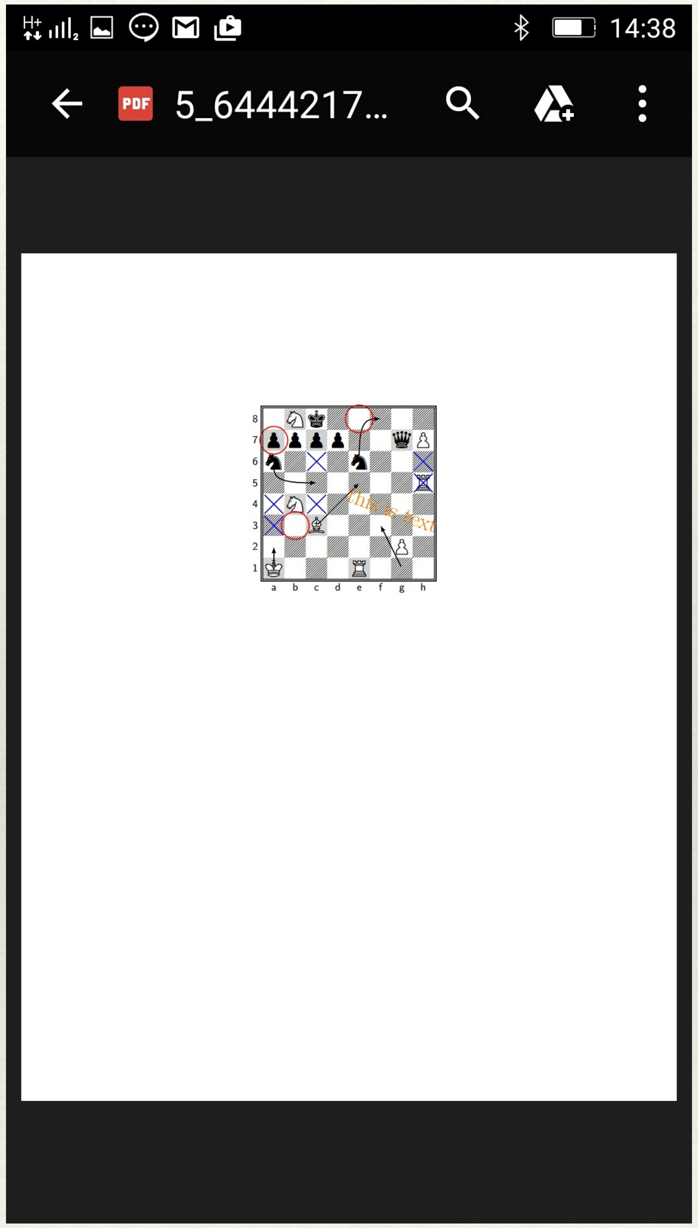
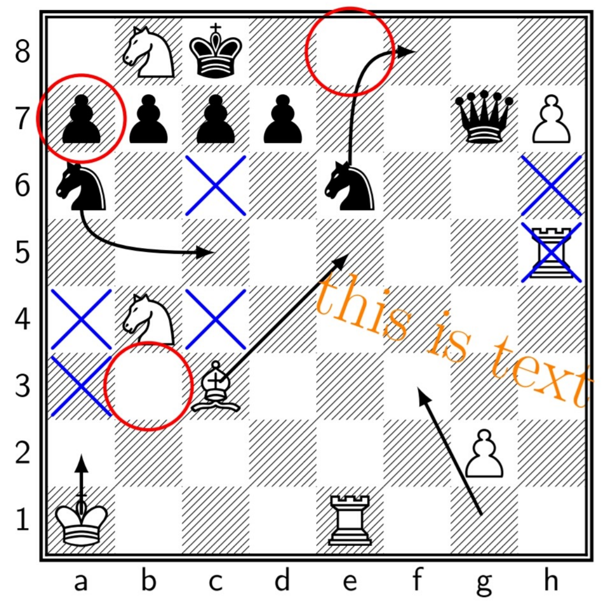


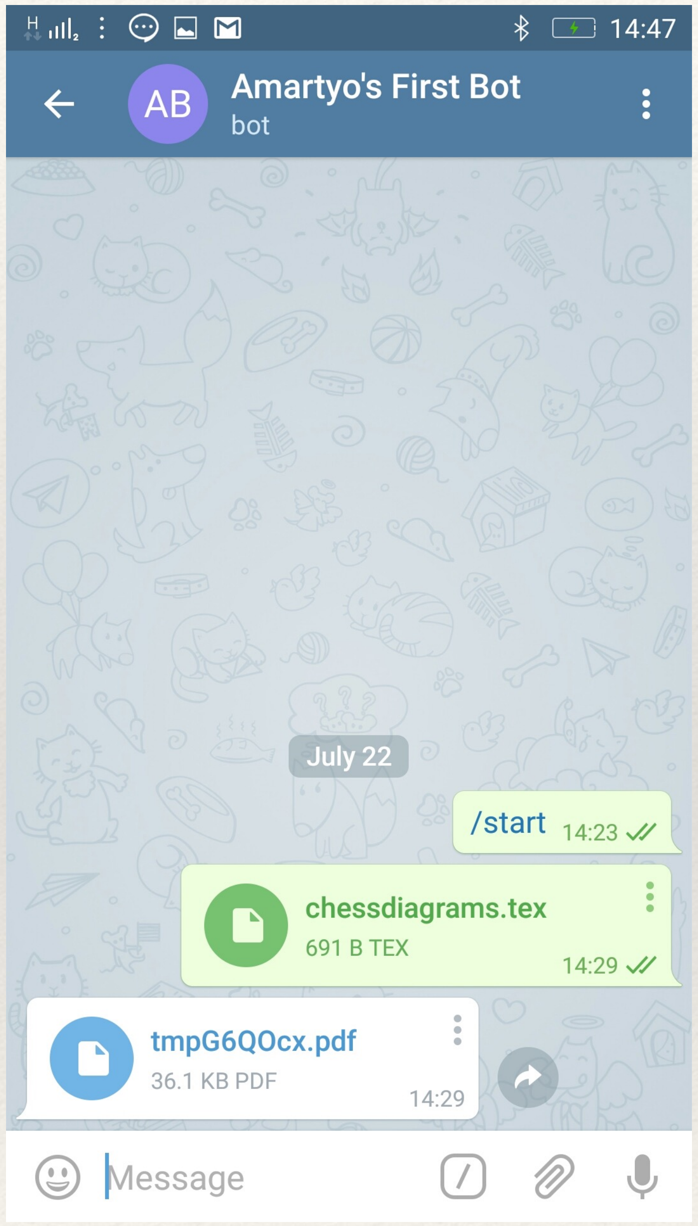


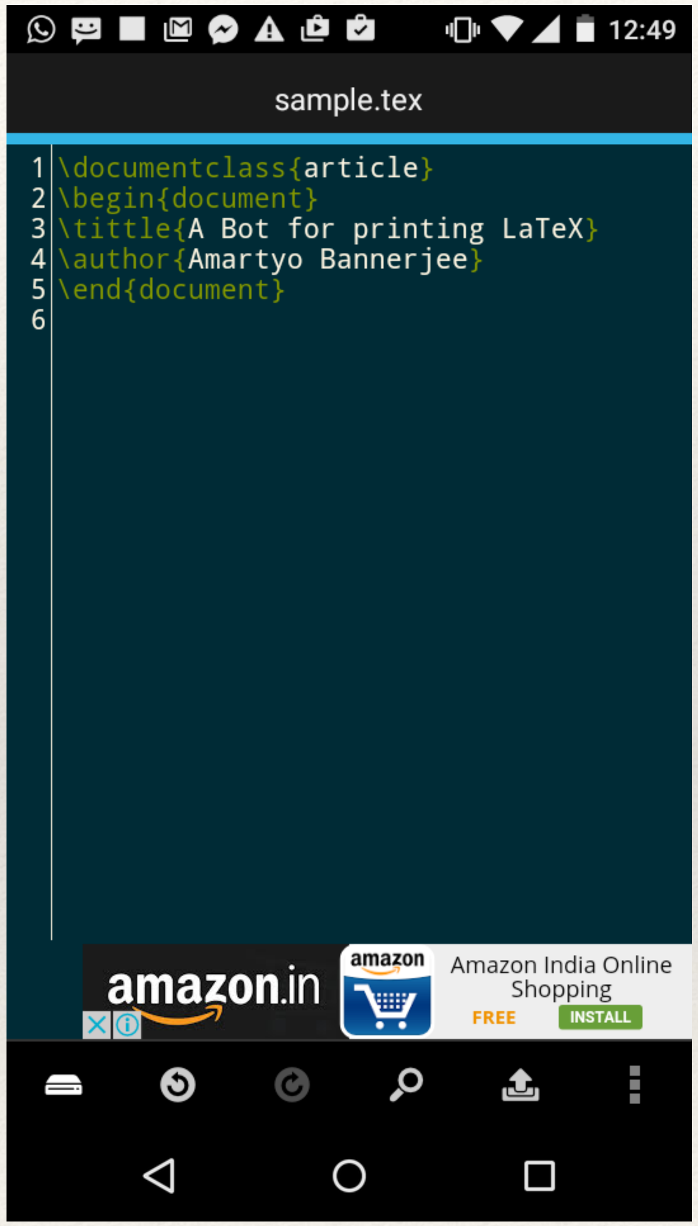
to download and preview.

User experience and implementation



User experience and implementation





```
\documentclass{article}
\begin{document}
\tittle{A Bot for printing LaTeX}
\author{Amartyo Bannerjee}
\end{document}

```

After preview, the user may edit the TeX file,
send it for compilation again and do so repeatedly

Additional functionality

- Batch ability with support for zip upload, subject to certain file naming conventions
- Option to request a PDF for preview to approval ahead of print or to directly order the print
- We may need to database user and vendor information and build a light workflow and communication protocol between them

Production readiness

- When latexmk fails to compile a single or multifile TeX document, the bot should send error messages to the user, to enable the user to correct whatever errors caused latexmk to fail, whether in the syntax of a single LaTeX file, or in the paths where other LaTeX files or graphics/font files are supposed to exist.
- When latexmk fails because the user only ever intended to produce Postscript as the final output, not PDF, and that pdflatex has failed because the LaTeX files refer to Postscript files for use as figures, not Encapsulated Postscript, the bot should attempt to invoke latexmk with the option to produce a Postscript file as the final output, not PDF.
- Also when users intend their files to be compiled by xelatex, not pdflatex, the bot should invoke latexmk appropriately.
- Perhaps we should invoke latexmk by default with the ‘-pdf' option, then try with the '-xelatex' option, and if that fails try with the '-ps' option. If all these fail, send error message.
- To handle cases where latexmk returns ‘0’, but the intended PDF does not contain what the user intended, such as can happen when typesetting music with abc notation, we may need to fix abcm2ps or pdflatex, so the latter exits with a non-zero value
- Input file sanitisation to thwart attacks and vulnerabilities, including checks for mime types, viruses etc.

Epilogue

- As of now, the bot is installed on the Raspberry Pi and it needs to be started manually, after the Raspberry Pi is powered up. This should be automated, while addressing the improvements outlined above including the printing functionality.