

Task6

FFMPEG

ffmpeg -i earth_story.mkv -c:v libx264 -vf scale=3840:2160 -rc constqp -qp 24 earth_story_2160.mp4

```
Share View
> This PC > New Volume (E:) > GTP-Batch-04 > Task6-ffmpeg-mp4
Search Task6-ffmpeg-mp4

Name      Date modified      Type      Size
earth_story.mkv      22/05/2023 11:58 pm      MKV File      287,943 KB
earth_story_2160.mp4  23/05/2023 10:55 pm      MP4 File      96,209 KB
Task6-ffmpeg-mp4.docx 23/05/2023 10:32 pm      Microsoft Word D... 14 KB

C:\Windows\System32\cmd.exe
Stream #0:1(eng): Audio: aac (LC) (mp4a / 0x6134706D), 48000 Hz, stereo, fltp, 128 kb/s (default)
Metadata:
  encoder      : Lavc60.14.101 aac
[out#0/mp4 @ 000002227c525a40] video:93963kB audio:2100kB subtitle:0kB other streams:0kB global headers:0kB muxing over
head: 0.151923%
frame= 4057 fps=8.0 q=-1.0 Lsize= 96209kB time=00:02:15.40 bitrate=5820.7kbts/s speed=0.265x
[libx264 @ 000002227c525a40] frame I:17 Avg QP:21.00 size:1366837
[libx264 @ 000002227c525a40] frame P:1167 Avg QP:24.00 size: 53626
[libx264 @ 000002227c525a40] frame B:2873 Avg QP:25.68 size: 3620
[libx264 @ 000002227c525a40] consecutive B-frames: 3.7% 4.9% 1.7% 89.6%
[libx264 @ 000002227c525a40] mb I I16..4: 27.7% 48.8% 23.5%
[libx264 @ 000002227c525a40] mb P I16..4: 2.3% 1.6% 0.5% P16..4: 9.7% 1.0% 1.3% 0.0% 0.0% skip:83.5%
[libx264 @ 000002227c525a40] mb B I16..4: 0.2% 0.0% 0.0% B16..8: 5.7% 0.2% 0.1% direct: 0.4% skip:93.5% L0:3
5.1% L1:62.4% BI: 2.5%
[libx264 @ 000002227c525a40] 8x8 transform intra:36.6% inter:74.8%
[libx264 @ 000002227c525a40] coded y,uvDC,uvAC intra: 38.1% 39.5% 16.3% inter: 2.1% 2.6% 0.3%
[libx264 @ 000002227c525a40] i16 v,h,dc,p: 45% 34% 7% 14%
[libx264 @ 000002227c525a40] i8 v,h,dc,ddl,ddr,vr,hd,vl,hu: 18% 21% 26% 5% 5% 5% 7% 5% 7%
[libx264 @ 000002227c525a40] i4 v,h,dc,ddl,ddr,vr,hd,vl,hu: 26% 23% 14% 5% 6% 6% 7% 5% 7%
[libx264 @ 000002227c525a40] i8c dc,h,v,p: 50% 25% 21% 3%
[libx264 @ 000002227c525a40] Weighted P-Frames: Y:3.6% UV:3.5%
[libx264 @ 000002227c525a40] ref P L0: 64.4% 23.6% 10.2% 1.7% 0.0%
[libx264 @ 000002227c525a40] ref B L0: 85.3% 13.2% 1.5%
[libx264 @ 000002227c525a40] ref B L1: 96.2% 3.8%
[libx264 @ 000002227c525a40] kb/s:5686.25
[aac @ 000002227cd953c0] Qavg: 1604.174

E:\GTP-Batch-04\Task6-ffmpeg-mp4>
```

ffmpeg -i earth_story.mkv -c:v libx264 -vf scale=2560:1440 -rc constqp -qp 24 earth_story_1440.mp4

```
This PC > New Volume (E:) > GTP-Batch-04 > Task6-ffmpeg-mp4
Search Task6-ffmpeg-mp4

Name      Date modified      Type      Size
earth_story.mkv      22/05/2023 11:58 pm      MKV File      287,943 KB
earth_story_1440.mp4  23/05/2023 11:01 pm      MP4 File      48,740 KB
earth_story_2160.mp4  23/05/2023 10:55 pm      MP4 File      96,209 KB
Task6-ffmpeg-mp4.docx 23/05/2023 10:32 pm      Microsoft Word D... 14 KB

C:\Windows\System32\cmd.exe
Side data:
  cpb: bitrate max/min/avg: 0/0/0 buffer size: 0 vbv_delay: N/A
Stream #0:1(eng): Audio: aac (LC) (mp4a / 0x6134706D), 48000 Hz, stereo, fltp, 128 kb/s (default)
Metadata:
  encoder      : Lavc60.14.101 aac
[out#0/mp4 @ 00000271cc272540] video:46494kB audio:2100kB subtitle:0kB other streams:0kB global headers:0kB muxing over
head: 0.300039%
frame= 4057 fps= 14 q=-1.0 Lsize= 48740kB time=00:02:15.40 bitrate=2948.8kbts/s speed=0.483x
[libx264 @ 00000271cc2ee680] frame I:17 Avg QP:21.00 size:669127
[libx264 @ 00000271cc2ee680] frame P:1170 Avg QP:24.00 size: 26450
[libx264 @ 00000271cc2ee680] frame B:2870 Avg QP:25.67 size: 1842
[libx264 @ 00000271cc2ee680] consecutive B-frames: 4.1% 4.1% 1.8% 90.0%
[libx264 @ 00000271cc2ee680] mb I I16..4: 28.0% 40.3% 31.6%
[libx264 @ 00000271cc2ee680] mb P I16..4: 1.8% 1.3% 0.6% P16..4: 9.5% 1.3% 1.5% 0.0% 0.0% skip:84.1%
[libx264 @ 00000271cc2ee680] mb B I16..4: 0.2% 0.0% 0.0% B16..8: 5.3% 0.2% 0.1% direct: 0.4% skip:93.8% L0:3
5.3% L1:60.0% BI: 3.7%
[libx264 @ 00000271cc2ee680] 8x8 transform intra:33.6% inter:70.1%
[libx264 @ 00000271cc2ee680] coded y,uvDC,uvAC intra: 42.1% 45.2% 21.6% inter: 2.3% 2.5% 0.4%
[libx264 @ 00000271cc2ee680] i16 v,h,dc,p: 41% 38% 6% 15%
[libx264 @ 00000271cc2ee680] i8 v,h,dc,ddl,ddr,vr,hd,vl,hu: 18% 24% 23% 5% 5% 5% 8% 5% 8%
[libx264 @ 00000271cc2ee680] i4 v,h,dc,ddl,ddr,vr,hd,vl,hu: 27% 23% 14% 5% 6% 6% 7% 5% 7%
[libx264 @ 00000271cc2ee680] i8c dc,h,v,p: 47% 27% 21% 4%
[libx264 @ 00000271cc2ee680] Weighted P-Frames: Y:3.3% UV:3.1%
[libx264 @ 00000271cc2ee680] ref P L0: 63.9% 24.3% 9.7% 2.0% 0.0%
[libx264 @ 00000271cc2ee680] ref B L0: 82.3% 15.2% 2.5%
[libx264 @ 00000271cc2ee680] ref B L1: 95.3% 4.7%
[libx264 @ 00000271cc2ee680] kb/s:2813.60
[aac @ 00000271cc30c480] Qavg: 1604.174

E:\GTP-Batch-04\Task6-ffmpeg-mp4>
```

Task6

ffmpeg -i earth_story.mkv -c:v libx264 -vf scale=1920:1080 -rc constqp -qp 24 earth_story_1080.mp4

```
This PC > New Volume (E:) > GTP-Batch-04 > Task6-ffmpeg-mp4

Name      Date modified      Type      Size
earth_story.mkv      22/05/2023 11:58 pm      MKV File      287,943 KB
earth_story_1080.mp4  23/05/2023 11:06 pm      MP4 File      30,278 KB
earth_story_1440.mp4  23/05/2023 11:01 pm      MP4 File      48,740 KB
earth_story_2160.mp4  23/05/2023 10:55 pm      MP4 File      96,209 KB
Task6-ffmpeg-mp4.docx 23/05/2023 10:32 pm      Microsoft Word D... 14 KB

C:\Windows\System32\cmd.exe

encoder      : Lavc60.14.101 aac
[out#0/mp4 @ 0000021155f02540] video:28032kB audio:2100kB subtitle:0kB other streams:0kB global headers:0kB muxing over
head: 0.483141%
frame= 4057 fps= 19 q=-1.0 Lsize= 30278kB time=00:02:15.40 bitrate=1831.8kbts/s speed=0.639x
[libx264 @ 0000021155f7e680] frame I:17 Avg QP:21.00 size:394420
[libx264 @ 0000021155f7e680] frame P:1193 Avg QP:24.00 size: 15680
[libx264 @ 0000021155f7e680] frame B:2847 Avg QP:25.67 size: 1157
[libx264 @ 0000021155f7e680] consecutive B-frames: 4.8% 4.2% 2.4% 88.6%
[libx264 @ 0000021155f7e680] mb I I16..4: 26.9% 36.9% 36.2%
[libx264 @ 0000021155f7e680] mb P I16..4: 1.5% 1.2% 0.7% P16..4: 9.6% 1.5% 1.5% 0.0% 0.0% skip:84.0%
[libx264 @ 0000021155f7e680] mb B I16..4: 0.2% 0.0% 0.0% B16..8: 5.1% 0.2% 0.1% direct: 0.4% skip:94.0% L0:3
6.3% L1:59.1% BI: 4.6%
[libx264 @ 0000021155f7e680] 8x8 transform intra:32.2% inter:66.0%
[libx264 @ 0000021155f7e680] coded y,uvDC,uvAC intra: 45.2% 49.2% 25.0% inter: 2.5% 2.6% 0.4%
[libx264 @ 0000021155f7e680] i16 v,h,dc,p: 39% 40% 6% 15%
[libx264 @ 0000021155f7e680] i8 v,h,dc,ddl,ddr,vr,hd,vl,hu: 19% 25% 23% 4% 5% 5% 8% 5% 8%
[libx264 @ 0000021155f7e680] i4 v,h,dc,ddl,ddr,vr,hd,vl,hu: 28% 23% 14% 5% 6% 6% 7% 5% 7%
[libx264 @ 0000021155f7e680] i8c dc,h,v,p: 45% 29% 22% 4%
[libx264 @ 0000021155f7e680] Weighted P-Frames: Y:3.9% UV:3.6%
[libx264 @ 0000021155f7e680] ref P L0: 62.8% 24.2% 10.5% 2.4% 0.0%
[libx264 @ 0000021155f7e680] ref B L0: 81.5% 15.4% 3.1%
[libx264 @ 0000021155f7e680] ref B L1: 95.2% 4.8%
[libx264 @ 0000021155f7e680] kb/s:1696.38
[aac @ 0000021155f9c480] Qavg: 1604.174

E:\GTP-Batch-04\Task6-ffmpeg-mp4>
```

ffmpeg -i earth_story.mkv -c:v libx264 -vf scale=1280:720 -rc constqp -qp 24 earth_story_720.mp4

```
This PC > New Volume (E:) > GTP-Batch-04 > Task6-ffmpeg-mp4

Name      Date modified      Type      Size
earth_story.mkv      22/05/2023 11:58 pm      MKV File      287,943 KB
earth_story_720.mp4   23/05/2023 11:08 pm      MP4 File      15,843 KB
earth_story_1080.mp4  23/05/2023 11:06 pm      MP4 File      30,278 KB
earth_story_1440.mp4  23/05/2023 11:01 pm      MP4 File      48,740 KB
earth_story_2160.mp4  23/05/2023 10:55 pm      MP4 File      96,209 KB
Task6-ffmpeg-mp4.docx 23/05/2023 10:32 pm      Microsoft Word D... 14 KB

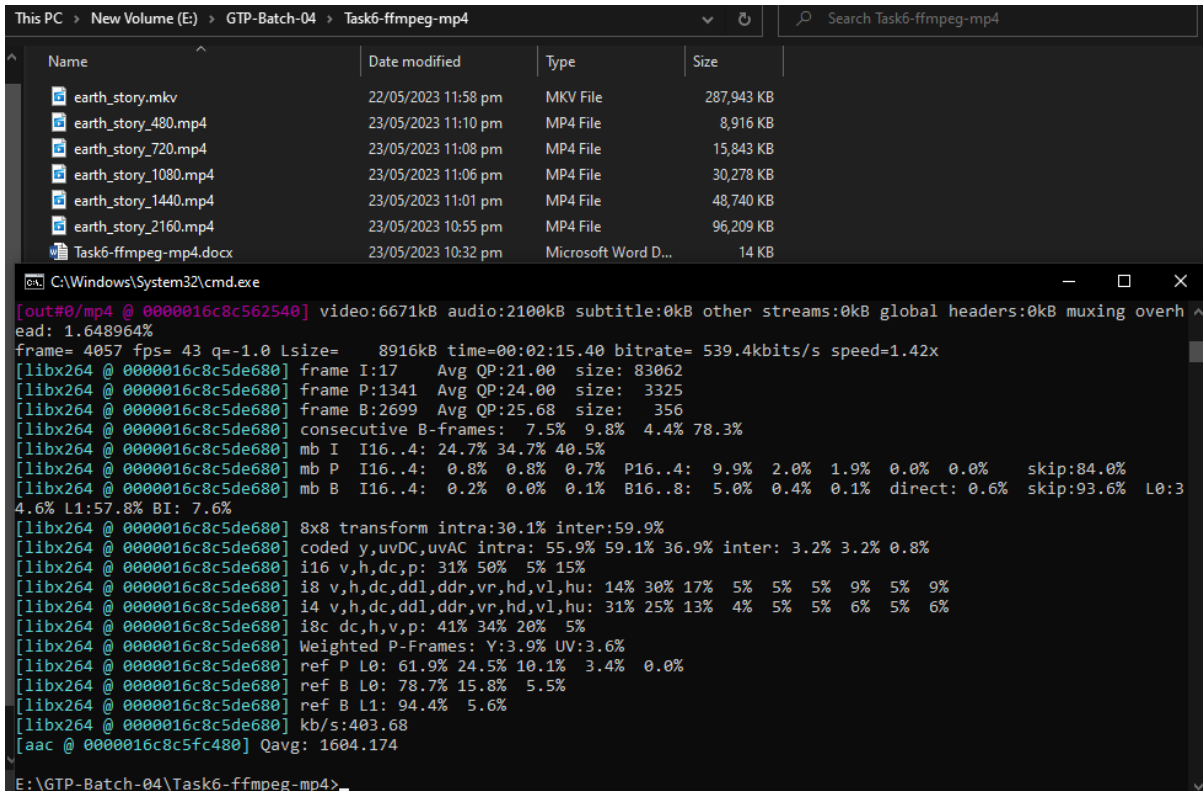
C:\Windows\System32\cmd.exe

encoder      : Lavc60.14.101 aac
[out#0/mp4 @ 0000020f7f7e2540] video:13598kB audio:2100kB subtitle:0kB other streams:0kB global headers:0kB muxing over
head: 0.926118%
frame= 4057 fps= 34 q=-1.0 Lsize= 15843kB time=00:02:15.40 bitrate= 958.5kbts/s speed=1.13x
[libx264 @ 0000020f7f785e680] frame I:17 Avg QP:21.00 size:180376
[libx264 @ 0000020f7f785e680] frame P:1243 Avg QP:24.00 size: 7274
[libx264 @ 0000020f7f785e680] frame B:2797 Avg QP:25.68 size: 649
[libx264 @ 0000020f7f785e680] consecutive B-frames: 5.4% 6.8% 3.5% 84.3%
[libx264 @ 0000020f7f785e680] mb I I16..4: 26.2% 35.1% 38.7%
[libx264 @ 0000020f7f785e680] mb P I16..4: 1.1% 1.0% 0.7% P16..4: 9.9% 1.7% 1.7% 0.0% 0.0% skip:83.9%
[libx264 @ 0000020f7f785e680] mb B I16..4: 0.2% 0.0% 0.1% B16..8: 5.1% 0.3% 0.1% direct: 0.5% skip:93.7% L0:3
6.4% L1:57.6% BI: 6.0%
[libx264 @ 0000020f7f785e680] 8x8 transform intra:31.5% inter:63.9%
[libx264 @ 0000020f7f785e680] coded y,uvDC,uvAC intra: 50.4% 53.5% 30.7% inter: 2.8% 2.9% 0.6%
[libx264 @ 0000020f7f785e680] i16 v,h,dc,p: 33% 46% 5% 16%
[libx264 @ 0000020f7f785e680] i8 v,h,dc,ddl,ddr,vr,hd,vl,hu: 17% 27% 20% 4% 5% 5% 9% 5% 9%
[libx264 @ 0000020f7f785e680] i4 v,h,dc,ddl,ddr,vr,hd,vl,hu: 30% 23% 13% 5% 5% 6% 7% 5% 6%
[libx264 @ 0000020f7f785e680] i8c dc,h,v,p: 42% 32% 21% 5%
[libx264 @ 0000020f7f785e680] Weighted P-Frames: Y:3.8% UV:3.5%
[libx264 @ 0000020f7f785e680] ref P L0: 62.2% 24.6% 10.2% 3.0% 0.0%
[libx264 @ 0000020f7f785e680] ref B L0: 78.2% 17.3% 4.5%
[libx264 @ 0000020f7f785e680] ref B L1: 94.3% 5.7%
[libx264 @ 0000020f7f785e680] kb/s:822.84
[aac @ 0000020f7f787c480] Qavg: 1604.174

E:\GTP-Batch-04\Task6-ffmpeg-mp4>
```

Task6

`ffmpeg -i earth_story.mkv -c:v libx264 -vf scale=854:480 -rc constqp -qp 24 earth_story_480.mp4`



The screenshot shows a Windows File Explorer window with the address bar set to 'This PC > New Volume (E:) > GTP-Batch-04 > Task6-ffmpeg-mp4'. The file list includes:

Name	Date modified	Type	Size
earth_story.mkv	22/05/2023 11:58 pm	MKV File	287,943 KB
earth_story_480.mp4	23/05/2023 11:10 pm	MP4 File	8,916 KB
earth_story_720.mp4	23/05/2023 11:08 pm	MP4 File	15,843 KB
earth_story_1080.mp4	23/05/2023 11:06 pm	MP4 File	30,278 KB
earth_story_1440.mp4	23/05/2023 11:01 pm	MP4 File	48,740 KB
earth_story_2160.mp4	23/05/2023 10:55 pm	MP4 File	96,209 KB
Task6-ffmpeg-mp4.docx	23/05/2023 10:32 pm	Microsoft Word D...	14 KB

Below the file list is a terminal window titled 'C:\Windows\System32\cmd.exe' showing the output of the ffmpeg command:

```
[out#0/mp4 @ 0000016c8c562540] video:6671kB audio:210kB subtitle:0kB other streams:0kB global headers:0kB muxing overh
ead: 1.648964%
frame= 4057 fps= 43 q=-1.0 Lsize=      8916kB time=00:02:15.40 bitrate= 539.4kbits/s speed=1.42x
[libx264 @ 0000016c8c5de680] frame I:17      Avg QP:21.00 size: 83062
[libx264 @ 0000016c8c5de680] frame P:1341   Avg QP:24.00 size: 3325
[libx264 @ 0000016c8c5de680] frame B:2699   Avg QP:25.68 size: 356
[libx264 @ 0000016c8c5de680] consecutive B-frames: 7.5% 9.8% 4.4% 78.3%
mb I I16..4: 24.7% 34.7% 40.5%
mb P I16..4: 0.8% 0.8% 0.7% P16..4: 9.9% 2.0% 1.9% 0.0% 0.0% skip:84.0%
mb B I16..4: 0.2% 0.0% 0.1% B16..8: 5.0% 0.4% 0.1% direct: 0.6% skip:93.6% L0:3
4.6% L1:57.8% BI: 7.6%
[libx264 @ 0000016c8c5de680] 8x8 transform intra:30.1% inter:59.9%
[libx264 @ 0000016c8c5de680] coded y,uvdc,uvac intra: 55.9% 59.1% 36.9% inter: 3.2% 3.2% 0.8%
[libx264 @ 0000016c8c5de680] i16 v,h,dc,p: 31% 50% 5% 15%
[libx264 @ 0000016c8c5de680] i8 v,h,dc,ddl,ddr,vr,hd,vl,hu: 14% 30% 17% 5% 5% 5% 9% 5% 9%
[libx264 @ 0000016c8c5de680] i4 v,h,dc,ddl,ddr,vr,hd,vl,hu: 31% 25% 13% 4% 5% 5% 6% 5% 6%
[libx264 @ 0000016c8c5de680] i8c dc,h,v,p: 41% 34% 20% 5%
[libx264 @ 0000016c8c5de680] Weighted P-Frames: Y:3.9% UV:3.6%
[libx264 @ 0000016c8c5de680] ref P L0: 61.9% 24.5% 10.1% 3.4% 0.0%
[libx264 @ 0000016c8c5de680] ref B L0: 78.7% 15.8% 5.5%
[libx264 @ 0000016c8c5de680] ref B L1: 94.4% 5.6%
[libx264 @ 0000016c8c5de680] kb/s:403.68
[aac @ 0000016c8c5fc480] Qavg: 1604.174
E:\GTP-Batch-04\Task6-ffmpeg-mp4>
```

Command Expalation:

`ffmpeg -i input -c:v libx264 -vf scale=854:480 -rc constqp -qp 24 output`

-i Input: Specifies input file.

-c:v libx264: Select the mostly used video codec libx264.

-vf scale: Scaling or resizing the video

-rc constqp -qp: The rate control method and quantization parameters for video encoding.

output: Specifies the output filename