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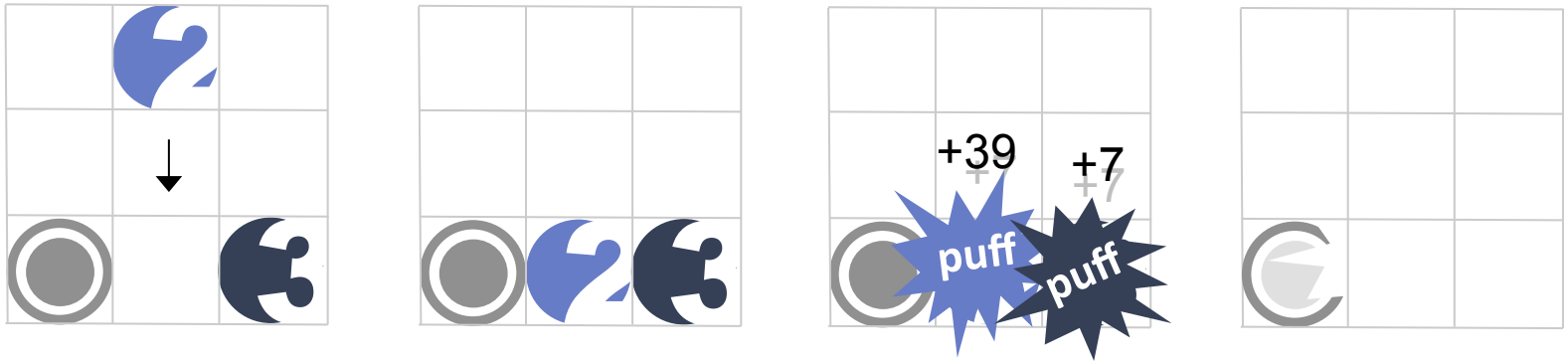
7

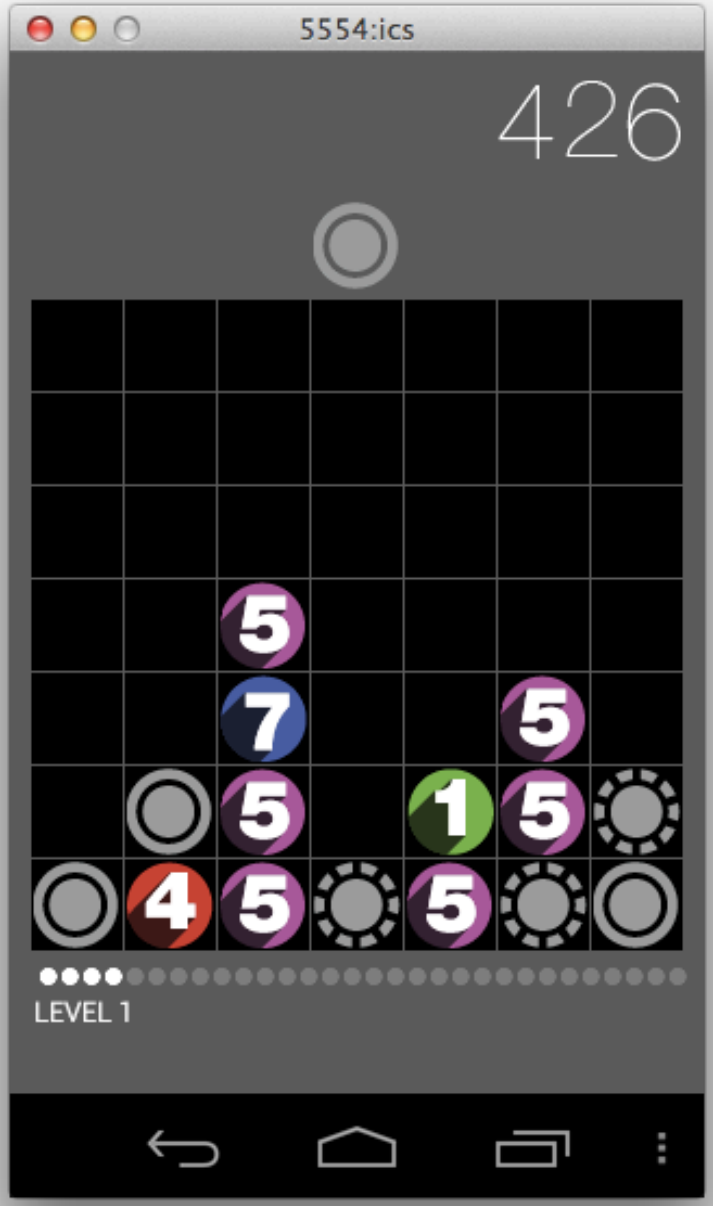
Drop7 + Problembeschreibung

Punkt 1: drop7.c
Punkt 2: mpi_queue.c
Punkt 3: sed ‘s/item/d7/g‘ queue_mpi.c

Leistungsanalyse

Optimierungsmöglichkeiten


+39
+7
puff
puff

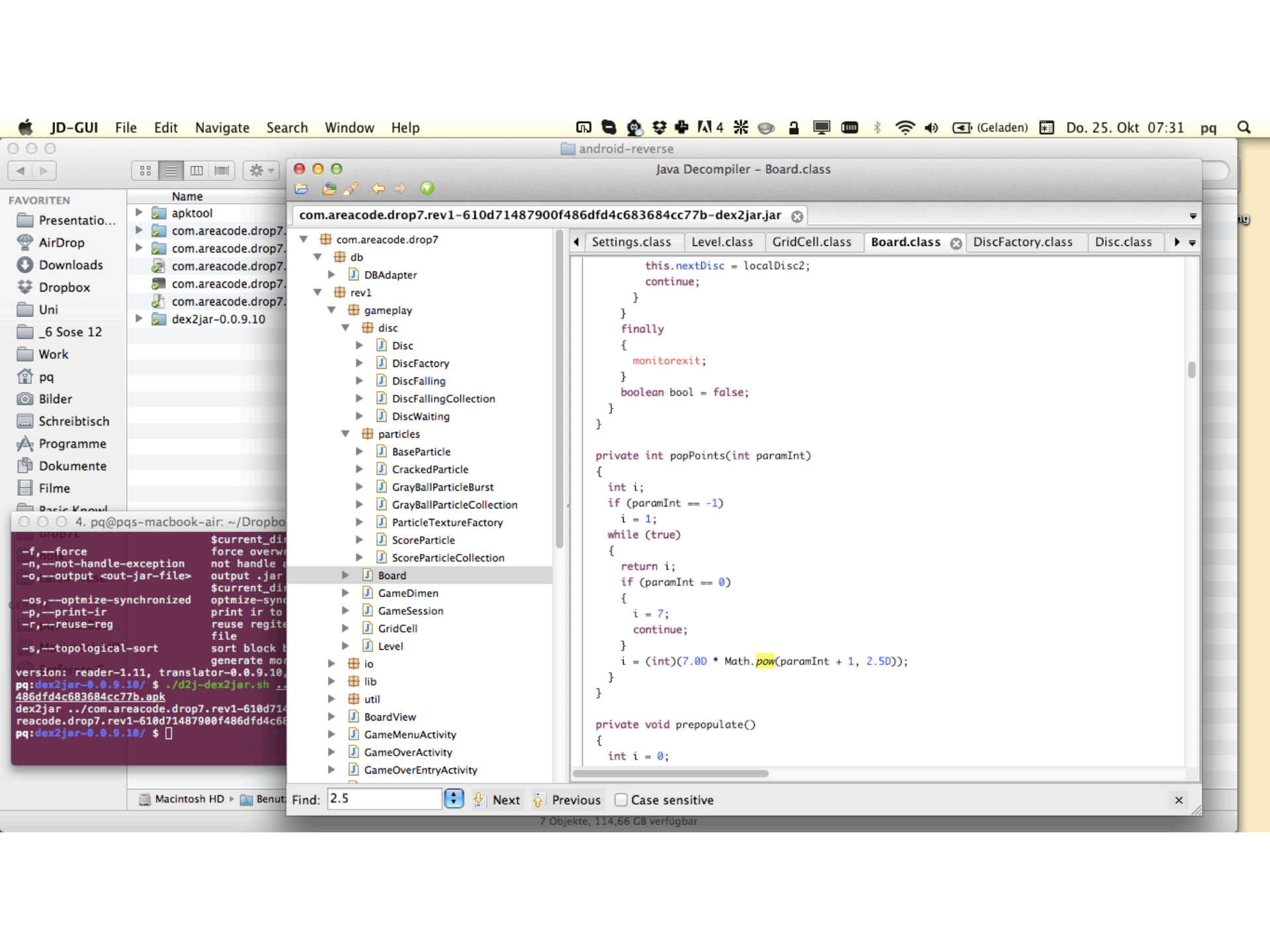

5554:ics
426
5
7
5
5
1
5
4
5
5
LEVEL 1

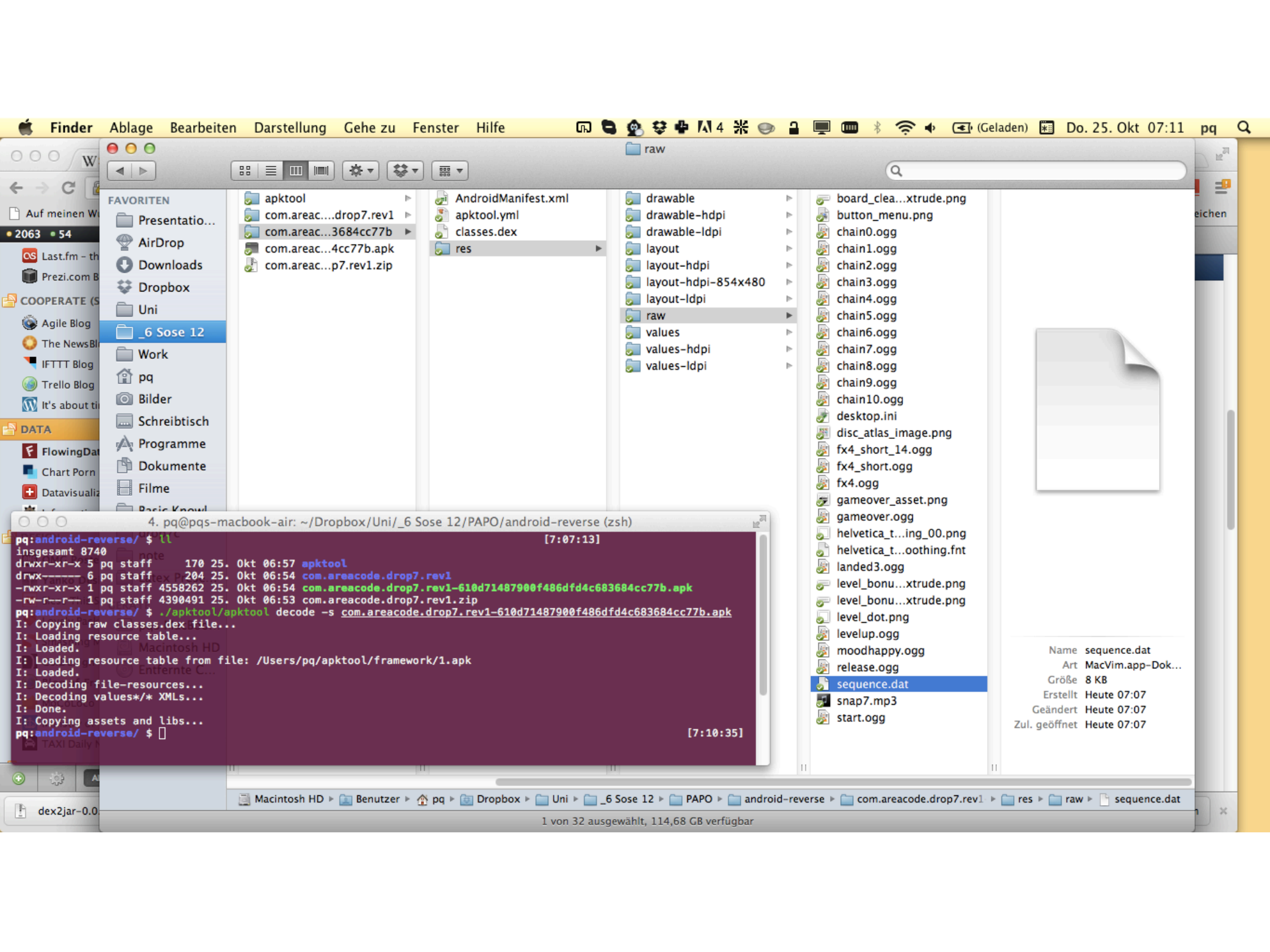
Titanium Backup, zum Sichern von Apps => com.areacode.drop7.apk
https://play.google.com/store/apps/details?id=com.keramidas.TitaniumBackup&hl=de

APK Tool, zum Extrahieren der Ressourcen und Assets einer App => Sequence.dat
http://code.google.com/p/android-apktool/downloads/list

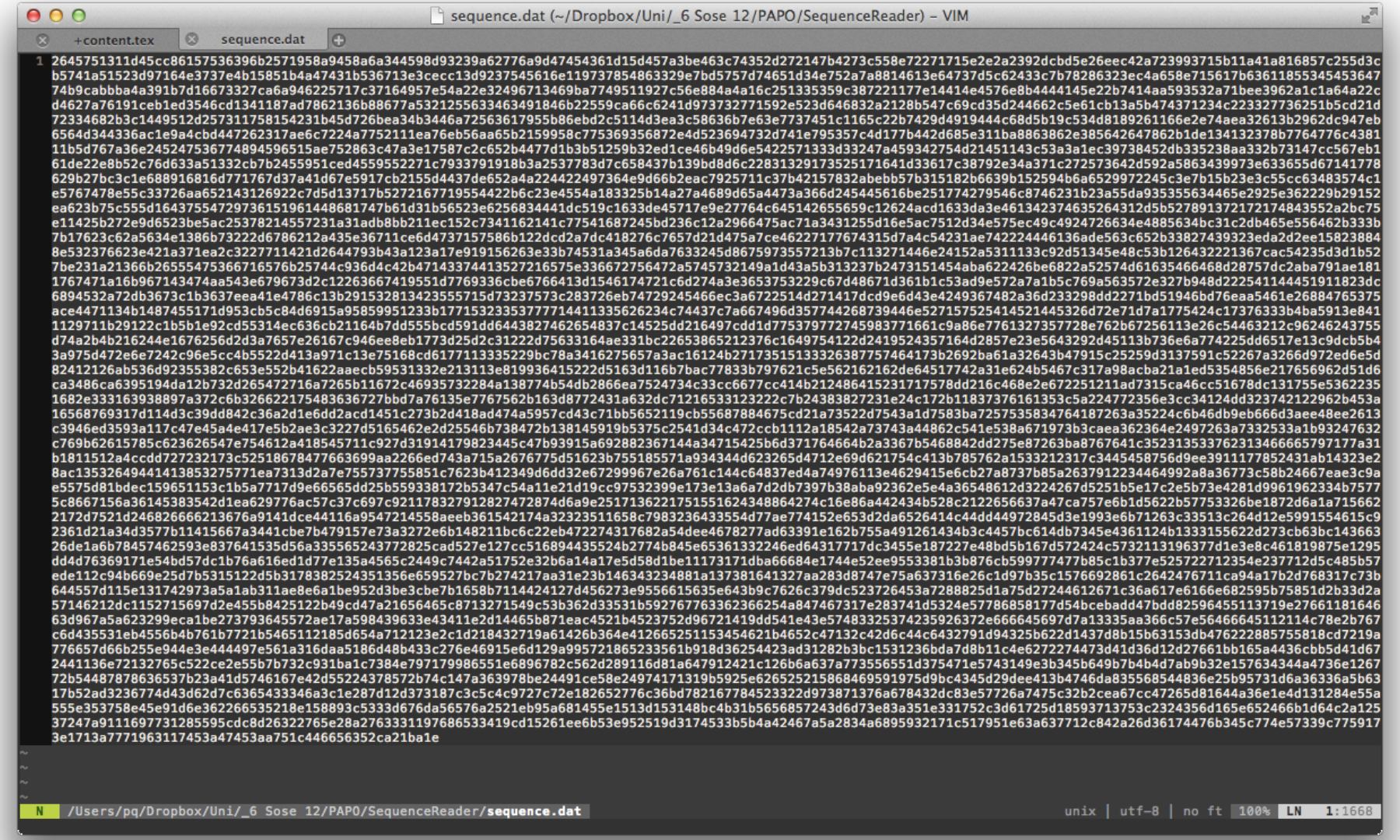
Dex2Jar, Decompile App to *.jar, zwar nicht direkt lauffähig aber wir wollen ja nur Lesen
http://code.google.com/p/dex2jar/

JD-Gui kann *.jar Dateien decompilieren und lässt einen die Quelldateien lesen
http://java.decompiler.free.fr/?q=jdeclipse


JD-GUI File Edit Navigate Search Window Help
Do. 25. Okt 07:31 pq
android-reverse
Java Decompiler – Board.class
com.areacode.drop7.rev1-610d71487900f486dfd4c683684cc77b-dex2jar.jar
Settings.class
Level.class
GridCell.class
Board.class
DiscFactory.class
Disc.class
com.areacode.drop7
db
DBAdapter
rev1
gameplay
disc
Disc
DiscFactory
DiscFalling
DiscFallingCollection
DiscWaiting
particles
BaseParticle
CrackedParticle
GrayBallParticleBurst
GrayBallParticleCollection
ParticleTextureFactory
ScoreParticle
ScoreParticleCollection
Board
GameDimen
GameSession
GridCell
Level
io
lib
util
BoardView
GameMenuActivity
GameOverActivity
GameOverEntryActivity
this.nextDisc = localDisc2;
continue;
}
}
finally
{
monitorexit;
}
boolean bool = false;
}
}
private int popPoints(int paramInt)
{
int i;
if (paramInt == -1)
i = 1;
while (true)
{
return i;
if (paramInt == 0)
{
i = 7;
continue;
}
i = (int)(7.0D * Math.pow(paramInt + 1, 2.5D));
}
}
private void prepopulate()
{
int i = 0;
Find: 2.5
Next
Previous
Case sensitive
4. pq@pqs-macbook-air: ~/Dropbo
-f,--force
-n,--not-handle-exception
-o,--output <out-jar-file>
-os,--optmize-synchronized
-p,--print-ir
-r,--reuse-reg
-s,--topological-sort
version: reader-1.11, translator-0.0.9.10,
pq:dex2jar-0.0.9.10/ $ ./d2j-dex2jar.sh ..
486dfd4c683684cc77b.apk
dex2jar ../com.areacode.drop7.rev1-610d714
reacode.drop7.rev1-610d71487900f486dfd4c68
pq:dex2jar-0.0.9.10/ $
FAVORITEN
Presentatio...
AirDrop
Downloads
Dropbox
Uni
_6 Sose 12
Work
pq
Bilder
Schreibtisch
Programme
Dokumente
Filme
Name
apktool
com.areacode.drop7.
com.areacode.drop7.
com.areacode.drop7.
com.areacode.drop7.
com.areacode.drop7.
dex2jar-0.0.9.10
Macintosh HD
7 Objekte, 114,66 GB verfügbar


Finder Ablage Bearbeiten Darstellung Gehe zu Fenster Hilfe
(Geladen) Do. 25. Okt 07:11 pq
raw
FAVORITEN
Presentatio...
AirDrop
Downloads
Dropbox
Uni
_6 Sose 12
Work
pq
Bilder
Schreibtisch
Programme
Dokumente
Filme
apktool
com.areac....drop7.rev1
com.areac...3684cc77b
com.areac...4cc77b.apk
com.areac...p7.rev1.zip
AndroidManifest.xml
apktool.yml
classes.dex
res
drawable
drawable-hdpi
drawable-ldpi
layout
layout-hdpi
layout-hdpi-854x480
layout-ldpi
raw
values
values-hdpi
values-ldpi
board_clea...xtrude.png
button_menu.png
chain0.ogg
chain1.ogg
chain2.ogg
chain3.ogg
chain4.ogg
chain5.ogg
chain6.ogg
chain7.ogg
chain8.ogg
chain9.ogg
chain10.ogg
desktop.ini
disc_atlas_image.png
fx4_short_14.ogg
fx4_short.ogg
fx4.ogg
gameover_asset.png
gameover.ogg
helvetica_t...ing_00.png
helvetica_t...oothing.fnt
landed3.ogg
level_bonu...xtrude.png
level_bonu...xtrude.png
level_dot.png
levelup.ogg
moodhappy.ogg
release.ogg
sequence.dat
snap7.mp3
start.ogg
Name sequence.dat
Art MacVim.app-Dok...
Größe 8 KB
Erstellt Heute 07:07
Geändert Heute 07:07
Zul. geöffnet Heute 07:07
4. pq@pqs-macbook-air: ~/Dropbox/Uni/_6 Sose 12/PAPO/android-reverse (zsh)
pq:android-reverse/ $ ll [7:07:13]
insgesamt 8740
drwxr-xr-x 5 pq staff 170 25. Okt 06:57 apktool
drwx------ 6 pq staff 204 25. Okt 06:54 com.areacode.drop7.rev1
-rwxr-xr-x 1 pq staff 4558262 25. Okt 06:54 com.areacode.drop7.rev1-610d71487900f486dfd4c683684cc77b.apk
-rw-r--r-- 1 pq staff 4390491 25. Okt 06:53 com.areacode.drop7.rev1.zip
pq:android-reverse/ $ ./apktool/apktool decode -s com.areacode.drop7.rev1-610d71487900f486dfd4c683684cc77b.apk
I: Copying raw classes.dex file...
I: Loading resource table...
I: Loaded.
I: Loading resource table from file: /Users/pq/apktool/framework/1.apk
I: Loaded.
I: Decoding file-resources...
I: Decoding values*/* XMLs...
I: Done.
I: Copying assets and libs...
pq:android-reverse/ $ [7:10:35]
Macintosh HD ▸ Benutzer ▸ pq ▸ Dropbox ▸ Uni ▸ _6 Sose 12 ▸ PAPO ▸ android-reverse ▸ com.areacode.drop7.rev1 ▸ res ▸ raw ▸ sequence.dat
1 von 32 ausgewählt, 114,68 GB verfügbar

:/


sequence.dat (~/Dropbox/Uni/_6 Sose 12/PAPO/SequenceReader) – VIM
+content.tex
sequence.dat
2645751311d45cc86157536396b2571958a9458a6a344598d93239a62776a9d47454361d15d457a3be463c74352d272147b4273c558e72271715e2e2a2392dcbd5e26eec42a723993715b11a41a816857c255d3c
b5741a51523d97164e3737e4b15851b4a47431b536713e3cecc13d9237545616e119737854863329e7bd5757d74651d34e752a7a8814613e64737d5c62433c7b78286323ec4a658e715617b63611855345453647
74b9cabbba4a391b7d16673327ca6a946225717c37164957e54a22e32496713469ba7749511927c56e884a4a16c251335359c387221177e14414e4576e8b4444145e22b7414aa593532a71bee3962a1c1a64a22c
d4627a76191ceb1ed3546cd1341187ad7862136b88677a5321255633463491846b22559ca66c6241d973732771592e523d646832a2128b547c69cd35d244662c5e61cb13a5b474371234c2233277362515b5cd21d
72334682b3c1449512d257311758154231b45d726bea34b3446a72563617955b86ebd2c5114d3ea3c58636b7e63e7737451c1165c22b7429d4919444c68d5b19c534d8189261166e2e74aea32613b2962dc947eb
6564d344336ac1e9a4cbd447262317ae6c7224a7752111ea76eb56aa65b2159958c775369356872e4d523694732d741e795357c4d177b442d685e311ba8863862e385642647862b1de134132378b7764776c4381
11b5d767a36e24524753677489596515ae752863c47a3e17587c2c652b4477d1b3b51259b32ed1ce46b49d6e5422571333d33247a459342754d21451143c53a3a1ec39738452db335238aa332b73147cc567eb1
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629b27bc3c1e688916816d771767d37a41d67e5917cb2155d4437de652a4a224422497364e9d66b2eac7925711c37b42157832abebb57b315182b6639b152594b6a6529972245c3e7b15b23e3c55cc63483574c1
e5767478e55c33726aa652143126922c7d5d13717b5272167719554422b6c23e4554a183325b14a27a4689d65a4473a366d245445616be251774279546c8746231b23a55da935355634465e2925e362229b29152
ea623b75c555d164375547297361519614468l747b61d31b56523e6256834441dc519c1633de45717e9e27764c645142655659c12624acd1633da3e46134237463526431 2d5b5278913721721748434552a2bc75
e11425b272e9d6523be5ac25378214557231a31adb8bb211ec152c7341162141c77541687245bd236c12a2966475ac71a3431255d16e5ac7512d34e575ec49c4924726634e4885634bc31c2db465e556462b333b
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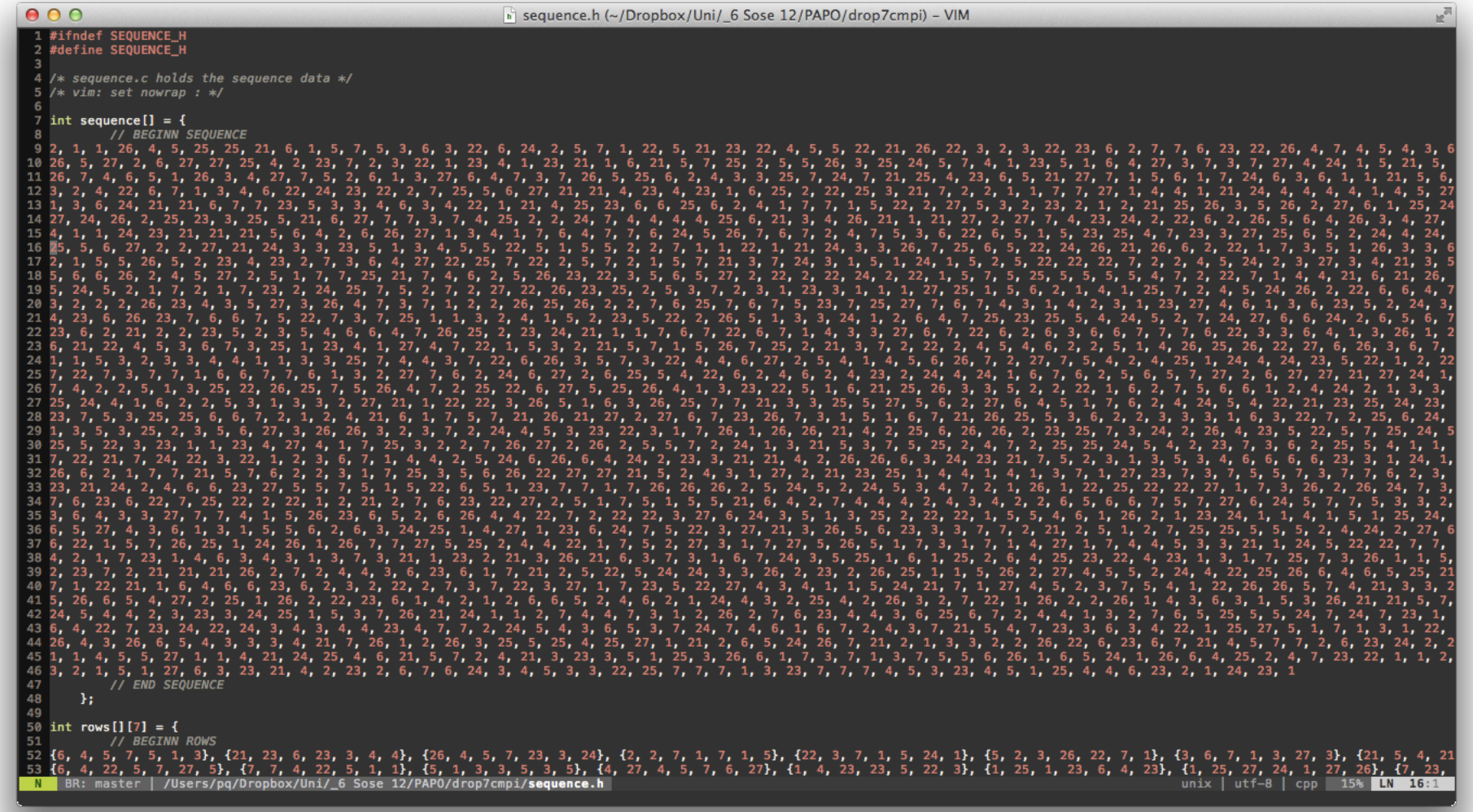
7be231a21366b2655547536671657 6b25744c936d4c42b4714337441352721657 5e336672756472a5745732149a1d43a5b313237b2473151454aba622426be6822a52574d61635466468d28757dc2aba791ae181
1767471a16b967143474aa543e679673d2c12263667419551d7769336cbe6766413d1546174721c6d274a3e3653753229c67d48671d361b1c53ad9e572a7a1b5c769a563572e327b948d22254114445191182 3dc
6894532a72db3673c1b3637eea41e4786c13b29153281342355571 5d73237573c283726eb74729245466ec3a6722514d271417dcd9e6d43e4249367482a36d233298dd2271bd51946bd76eaa5461e26884765375
ace4471134b1487455171d953cb5c84d6915a95859951233b17715323353777714411335626234c74437c7a667496d35774426873944 6e527157525414521445326d72e71d7a1775424c17376333b4ba5913e841
1129711b29122c1b5b1e92cd55314ec636cb21164b7dd555bcd591dd64438274626548 37c14525dd216497cdd1d7753797727459837716 61c9a86e77613273577 28e762b67256113e26c54463212c96246243755
d74a2b4b216244e1676256d2d3a7657e26167c946ee8eb1773d25d2c31222d75633164ae331bc226538652123766c1649754122d24195243571 64d2857e23e5643292d45113b736e6a774225dd6517e13c9dcb5b4
3a975d472e6e7242c96e5cc4b5522d413a971c13e75168cd6177113335229bc78a3416275657a3ac16124b27173515133326387757464173b2692ba61a32643b47915c25259d3137591c52267a3266d972ed6e5d
82412126ab536d92355382c653e552b41622aaecb59531332e213113e819936415222d5163d116b7bac77833b797621c5e562162162de64517742a31e624b5467c317a98acba21a1ed5354856e217656962d51d6
ca3486ca6395194da12b732d265472716a7265b11672c46935732284a138774b54db2866ea7524734c33cc6677cc414b21248641523171757 8dd216c468e2e672251211ad7315ca46cc51678dc131755e5362235
1682e333163938897a372c6b3266221754836367 27bbd7a76135e7767562b163d8772431a632dc712165331232222c7b24383827231e24c172b118373761613 53c5a224772356e3cc34124dd323742122962b453a
16568769317d114d3c39dd842c36a2d1e6dd2acd1451c273b2d418ad474a5957cd43c71bb5652119cb55687884675cd21a73522d7543a1d7583ba725753583476418726 3a35224c6b46db9eb666d3aee48ee2613
c3946ed3593a117c47e45a4e417e5b2ae3c3227d5165462e2d25546b738472b138145919b5375c2541d34c472ccb1112a18542a73743a44862c541e538a671973b3caea362364e2497263a7332533a1b93247632
c769b62615785c623626547e754612a418545711c927d31914179823445c47b93915a692882367144a34715425b6d371764664b2a3367b5468842dd275e87263ba8767641c3523135337623134666657971 77a31
b1811512a4ccdd727232173c525186784776636 99aa2266ed743a715a2676775d51623b755185571a934344d623265d4712e69d621754c413b785762a1533212317c3445458756d9ee3911177852431ab14323e2
8ac13532649441413853275771ea7313d2a7e755737755851c7623b412349d6dd32e67299967e26a761c144c64837ed4a74976113e4629415e6cb27a8737b85a263791223446496 2a8a36773c58b24667eae3c9a
e5575d81bdec159651153c1b5a7717d9e66565dd25b559338172b5347c54a11e21d19cc97532399e173e13a6a7d2db7397b38aba92362e5e4a36548612d3224267d5251b5e17c2e5b73e4281d9961962334b7577
5c8667156a36145383542d1ea629776ac57c37c697c9211783279128274728 74d6a9e2517136221751551624348864274c16e86a442434b528c2122656637a47ca757e6b1d5622b57753326be1872d6a1a715662
2172d7521d2468266662136 76a9141dce44116a9547214558aeeb361542174a32323511658c7983236433554d77ae774152e653d2da6526414c44dd44972845d3e1993e6b71263c33513c264d12e5991554615c9
2361d21a34d3577b11415667a3441cbe7b479157e73a3272e6b148211bc6c22eb472274317682a54dee4678277ad63391e162b755a491261434b3c4457bc614db7345e4361124b1333155622d273cb63bc143663
26de1a6b78457462593e837641535d56a3355652437728 25cad527e127cc516894435524b2774b845e65361332246ed64317717dc3455e187227e48bd5b167d572424c5732113196377d1e3e8c461819875e1295
dd4d76369171e54bd57dc1b76a616ed1d77e135a4565c2449c7442a51752e32b6a14a17e5d58d1be11173171dba66684e1744e52ee9553381b3b876cb599777477b85c1b377e525722712354e237712d5c485b57
ede112c94b669e25d7b5315122d5b3178382524351356e659527bc7b274217aa31e23b146343234881a137381641327aa283d8747e75a637316e26c1d97b35c1576692861c2642476711ca94a17b2d768317c73b
644557d115e131742973a5a1ab311ae8e6a1be952d3be3cbe7b1658b7114424127d456273e9556615635e643b9c7626c379dc523726453a7288825d1a75d27244612671c36a617e6166e682595b75851d2b33d2a
57146212dc1152715697d2e455b8425122b49cd47a21656465c8713271549c53b362d33531b59276776336236625 4a847467317e283741d5324e5778658177d54bcebadd47bdd82596455113719e27661181646
63d967a5a623299eca1be273793645572ae17a598439633e43411e2d14465b871eac4521b4523752d96721419dd541e43e57483325374235926372e666645697d7a13335aa366c57e56466645112114c78e2b767
c6d435531eb4556b4b761b7721b5465112185d654a712123e2c1d218432719a61426b364e41266525115345462 1b4652c47132c42d6c44c6432791d94325b622d1437d8b15b63153db4762228857558 8cd7219a
776657d66b255e944e3e444497e561a316daa5186d48b433c276e46915e6d129a995721865233561b918d36254423ad31282b3bc1531236bda7d8b11c4e6272274473d41d36d12d27661bb165a4436cbb5d41d67
2441136e72132765c522ce2e55b7b732c931ba1c7384e797179986551e6896782c562d289116d81a647912421c126b6a637a773556551d375471e5743149e3b345b649b7b4b4d7ab9b32e157634344a4736e1267
72b54487878636537b23a41d5746167e42d55224378572b74c147a363978be24491ce58e24974171319b5925e626525215868469591975d9bc4345d29dee413b4746da835568544836e25b95731d6a36336a5b63
17b52ad3236774d43d62d7c6365433346a3c1e287d12d373187c3c5c4c9727c72e182652776c36bd782167784523322d973871376a678432dc83e57726a7475c32b2cea67cc47265d81644a36e1e4d131284e55a
555e353758e45e91d6e362266535218e158893c5333d676da56576a2521eb95a681455e1513d153148bc4b31b5656857243d6d73e83a351e331752c3d61725d18593713753c2324356d165e652466b1d64c2a125
37247a9111697731285595cdc8d26322765e28a2763331197686533419cd15261ee6b53e952519d3174533b5b4a42467a5a2834a6895932171c517951e63a637712c842a26d36174476b345c774e57339c775917
3e1713a7771963117453a47453aa751c446656352ca21ba1e
N /Users/pq/Dropbox/Uni/_6 Sose 12/PAPO/SequenceReader/sequence.dat
unix | utf-8 | no ft 100% LN 1:1668


sequence.h (~/Dropbox/Uni/_6 Sose 12/PAPO/drop7cmpi) – VIM
#ifndef SEQUENCE_H
#define SEQUENCE_H
/* sequence.c holds the sequence data */
/* vim: set nowrap : */
int sequence[] = {
// BEGINN SEQUENCE
// END SEQUENCE
};
int rows[][7] = {
// BEGINN ROWS
{6, 4, 5, 7, 5, 1, 3}, {21, 23, 6, 23, 3, 4, 4}, {26, 4, 5, 7, 23, 3, 24}, {2, 2, 7, 1, 7, 1, 5}, {22, 3, 7, 1, 5, 24, 1}, {5, 2, 3, 26, 22, 7, 1}, {3, 6, 7, 1, 3, 27, 3}, {21, 5, 4, 21
{6, 4, 22, 5, 7, 27, 5}, {7, 7, 4, 22, 5, 1, 1}, {5, 1, 3, 3, 5, 3, 5}, {4, 27, 4, 5, 7, 6, 27}, {1, 4, 23, 23, 5, 22, 3}, {1, 25, 1, 23, 6, 4, 23}, {1, 25, 27, 24, 1, 27, 26}, {7, 23,
N BR: master | /Users/pq/Dropbox/Uni/_6 Sose 12/PAPO/drop7cmpi/sequence.h
unix | utf-8 | cpp 15% LN 16:1

3750

7

Punkt 1: drop7.c

Punkt 2: mpi_queue.c

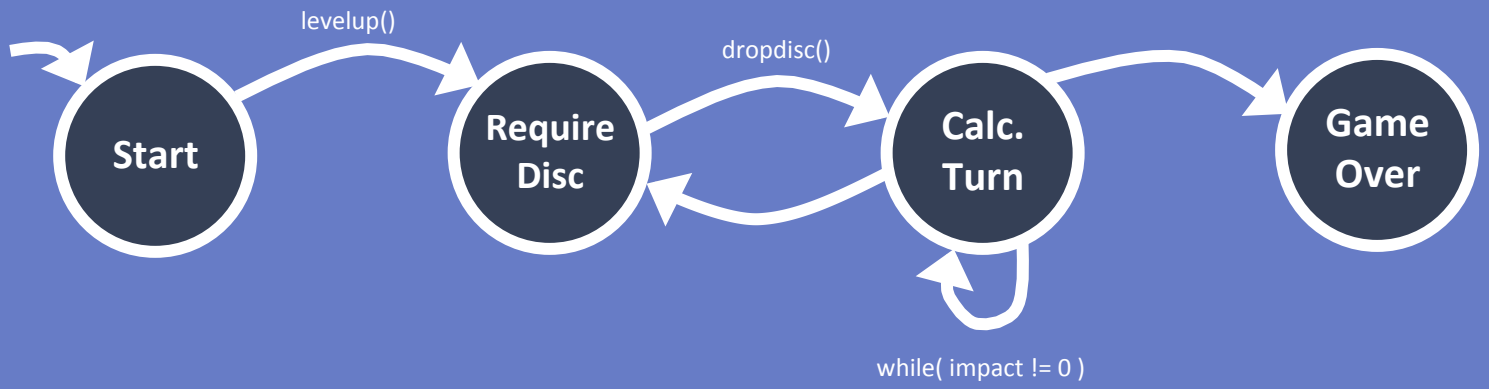
Punkt 3:

```
find ./ -type f | xargs sed -i ‘s/item/d7/g‘
```


7
drop
.c

```c
#define D7_STATUS_CALCULATE 0
#define D7_STATUS_REQUIRE_DISC 1
#define D7_STATUS_GAME_OVER 2

typedef struct d7 {
    int m[7][7];         // Spielfeld
    int sequence[3750]; // Spielfolge
    int score;
    int level;
    int nextleveldiscs;
    int turn;
    int discs;
    int status;
    int depth;
} d7;
```

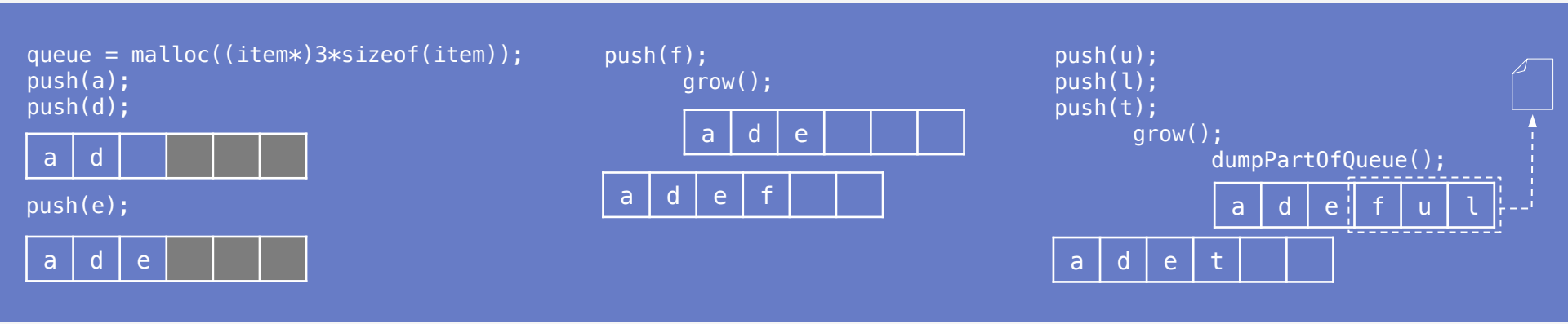
```c
d7 dropdisc(d7, int col, int disc);
d7 calcturn(d7);

d7_impact poppers_col(d7);
d7_impact poppers_row(d7);

d7_impact merge_impact(d7_impact, d7_impact);

d7 apply_impact(d7, d7_impact, int depth);

d7 gravity(d7);

d7 levelup(d7, int* row);
```



```
#include <stddef.h>
#include <mpi.h>
#include "d7.h"

MPI_Datatype mpi_d7;
MPI_Datatype types[] = { MPI_INT, MPI_INT, MPI_INT };
int blocklengths[] =   {     7*7,    3750,       1 };
MPI_Aint displacements[] = { offsetof(d7, m),
                             offsetof(d7, sequence),
                             offsetof(d7, score) };

MPI_Init( &argc, &argv );

MPI_Type_create_struct( 3,
   blocklengths, displacements, types, &mpi_d7 );
```

```
MPI_Send( &buf, 1, mpi_d7, rank, tag, MPI_COMM_WORLD );
```

```
struct item * queue;

int queue_len = 3;
int queue_count = 0;

void grow();
int push(item);
item pop();
```




```
void grow()
{
    item * tmp = (item*)realloc(queue, queue_len * sizeof(item) + 3);
    if (tmp == NULL)
        // Out of memory.
        dumpPartOfQueueToFile();
    else
        queue = tmp;
}
```

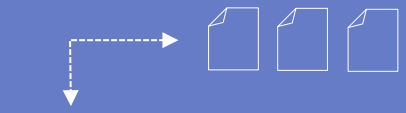
```
#include "tpl.h"
void dumpQueue() {
    tpl_node *tn;

    tn = tpl_map("A(S(i##i#iiiiiii))", &queue, 7, 7, 3750);

    for (int t = 0; t < queue_count; ++t) tpl_pack(tn,1);

    tpl_dump(tn, TPL_FILE, "dump.tpl");
    tpl_free(tn);
}
```

Serialisierung mit TPL: http://tpl.sourceforge.net/

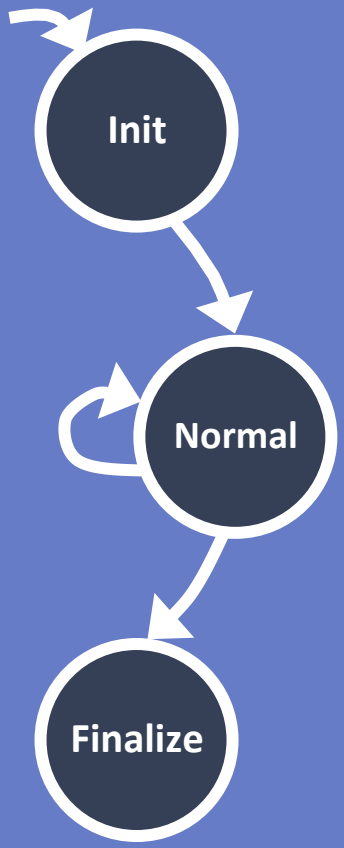
```
void loadQueueFromFile(struct dirent entry) {
    tpl_node *tn;
    d7 agame;

    tn = tpl_map("A(S(i##i#iiiiiii))", &agame, 7, 7, 3750);
    tpl_load(tn, TPL_FILE, "dump.tpl");
    while (tpl_unpack(tn,1) > 0)
        push(agame);
    tpl_free(tn);
}
```

Master

Worker

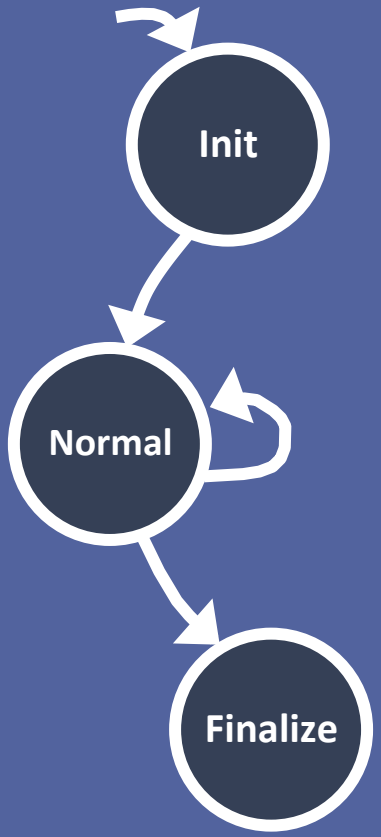


```
d7 * queue;
d7 best;
```



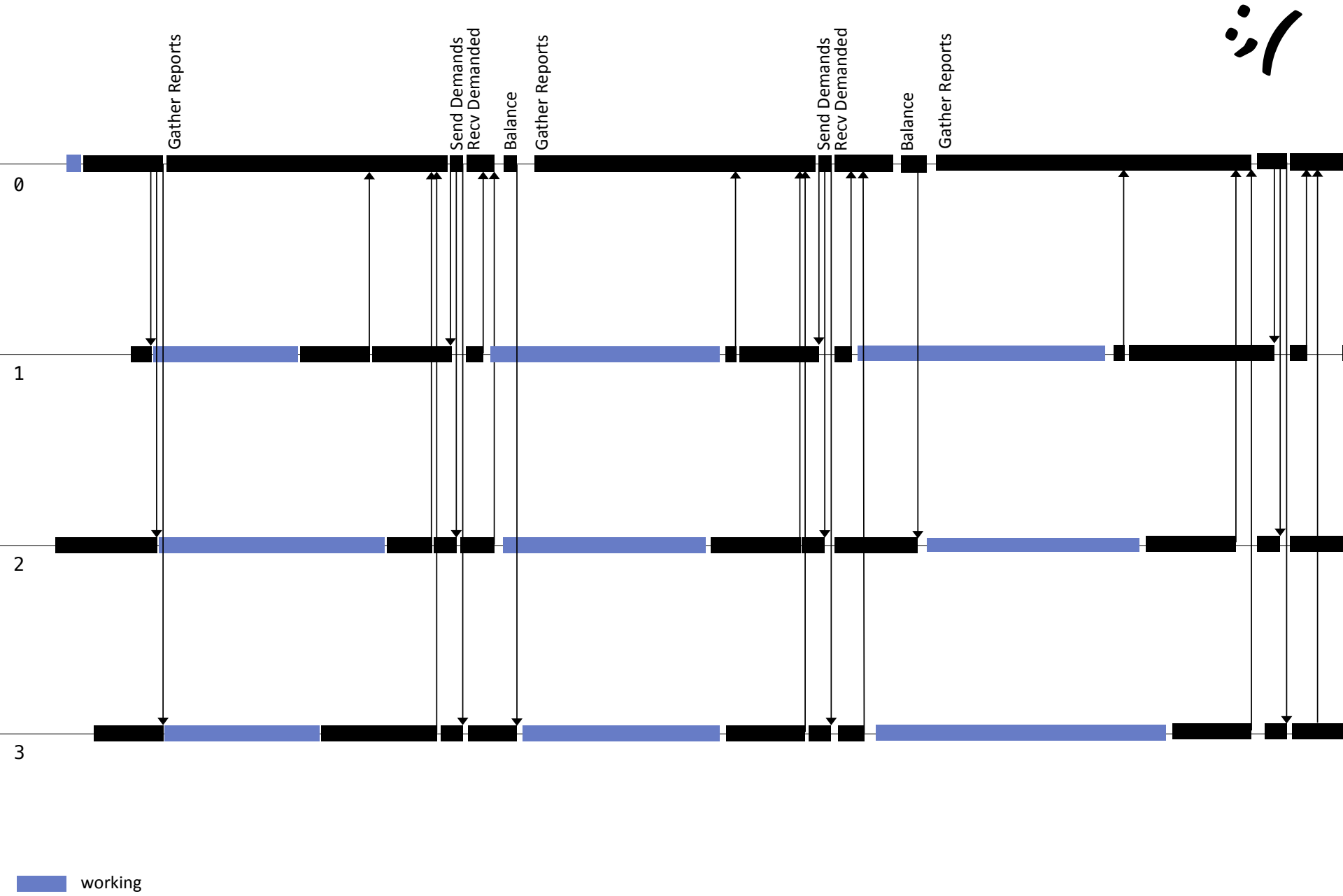

```
gatherReports();
BcastBest();
sendDemands();
recvDemanded();
balance();
```

```
d7 * queue;
d7 best;
```

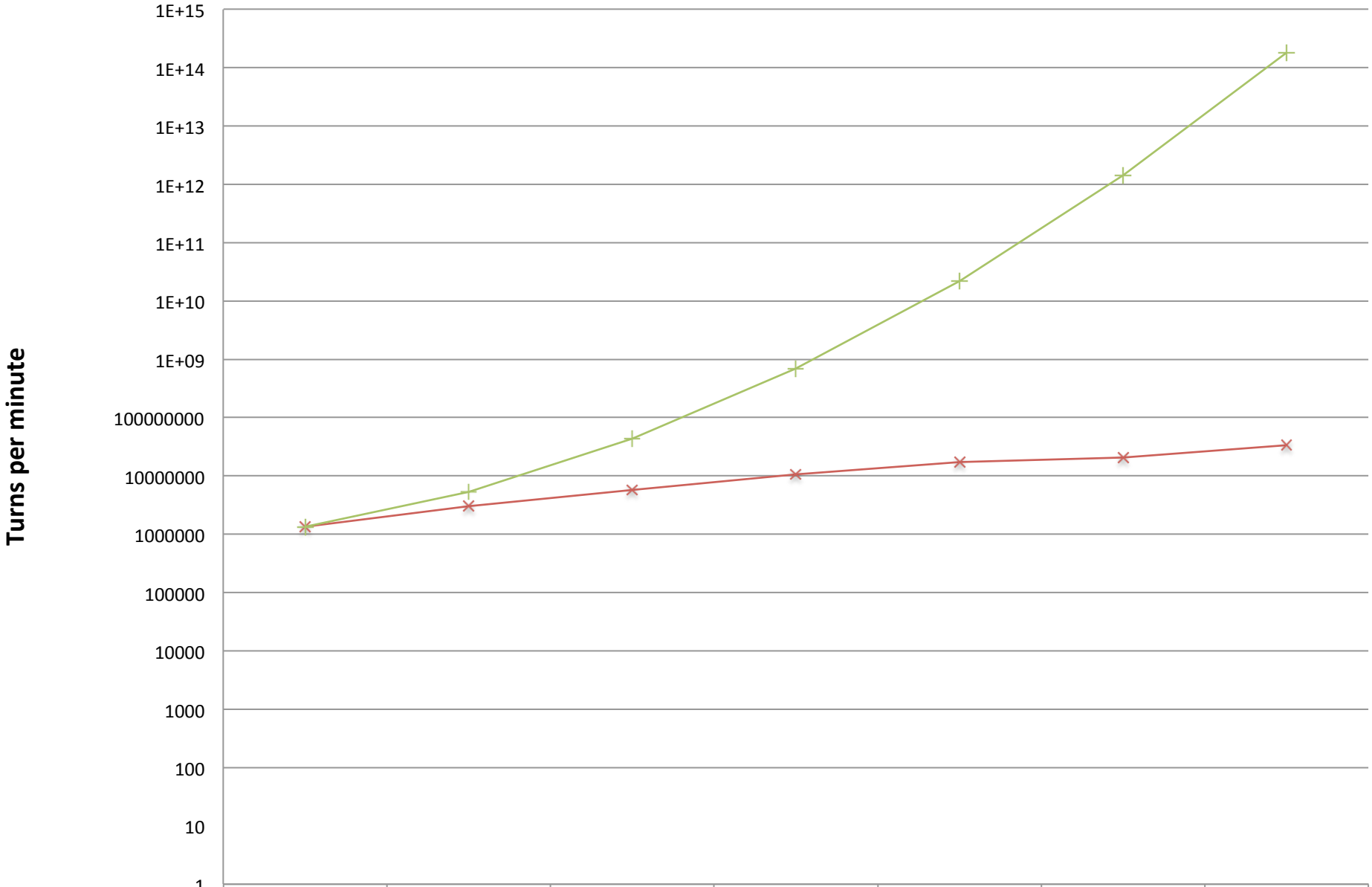



```
work();
sendReport();
recvBest();
recvDemands();
sendRecvDemanded();
```

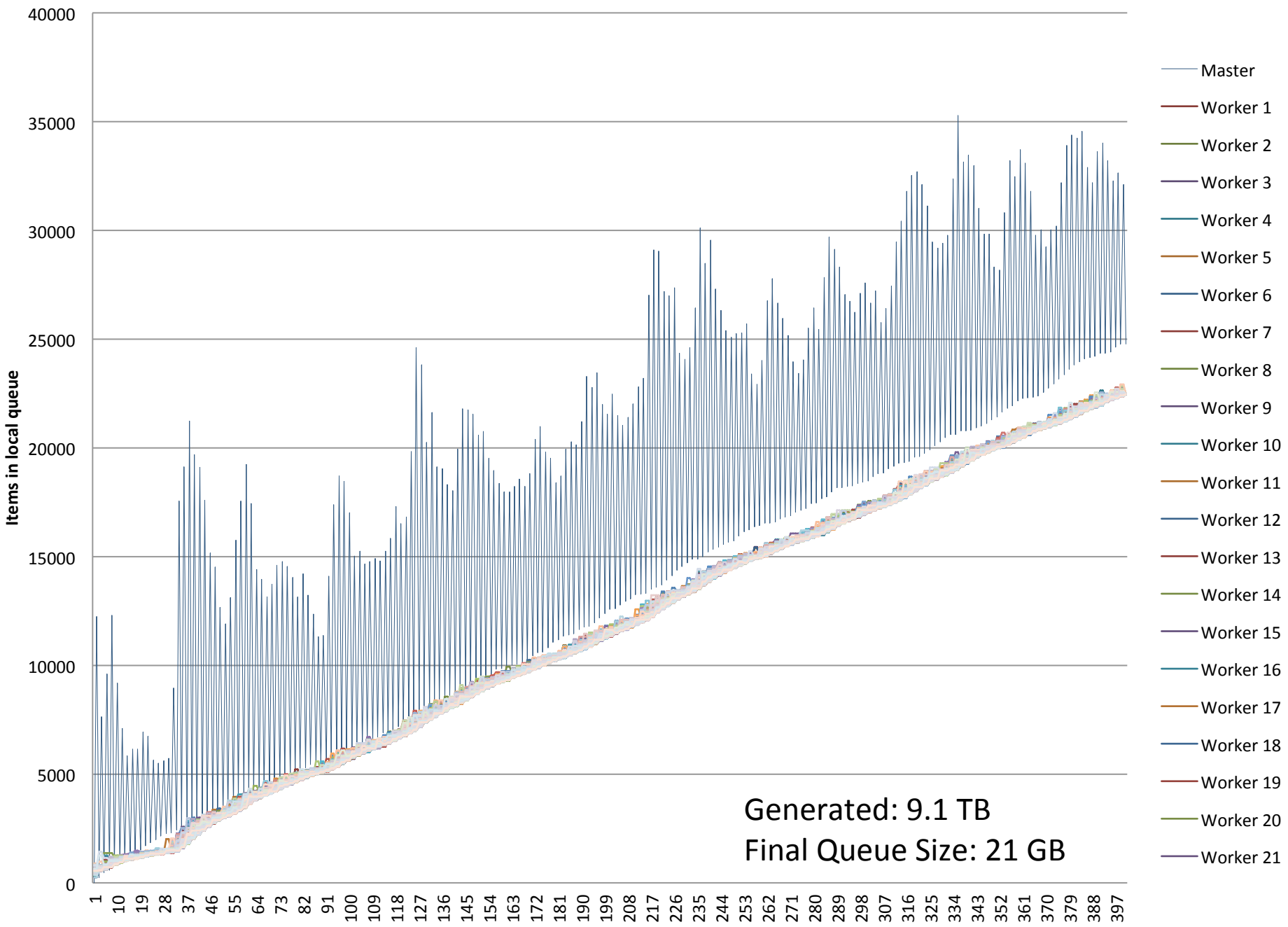
```
luettgau@cluster:~/drop7cmpi$ module load hdtrace/1.0-complete
ModuleCmd_Load.c(204):ERROR:105: Unable to locate a modulefile for 'hdtrace/1.0-complete'
```



Leistungsanalyse



Cores	2	4	8	16	32	64	128
Turns / Min.	1347179	3017708	5715230	10542499	17325913	20684082	33955173
Linear Performence	1347179	5388716	43109728	689755648	22072180736	1,41262E+12	1,80815E+14


Queue Counts at Iteration (x/2), 240 Cores (100000 Turns per Iteration)
Items in local queue
40000
35000
30000
25000
20000
15000
10000
5000
0
1
10
19
28
37
46
55
64
73
82
91
100
109
118
127
136
145
154
163
172
181
190
199
208
217
226
235
244
253
262
271
280
289
298
307
316
325
334
343
352
361
370
379
388
397
Master
Worker 1
Worker 2
Worker 3
Worker 4
Worker 5
Worker 6
Worker 7
Worker 8
Worker 9
Worker 10
Worker 11
Worker 12
Worker 13
Worker 14
Worker 15
Worker 16
Worker 17
Worker 18
Worker 19
Worker 20
Worker 21
Generated: 9.1 TB
Final Queue Size: 21 GB

Ideen Berechnung

- Lernfähige Arbeitsperiodenlänge
  - z.B. Rank 200 macht 2000 Zyklen mehr als Rank
- pthreads beim Warten auf Lastausgleich
- Spiel-Heuristik
- etwas breitere Suche

Ideen Kommunikation

- Worker-Worker Kommunikation
  - Hypercube/Ringe
- Quasi-Null-Kommunikation
- Komprimierung

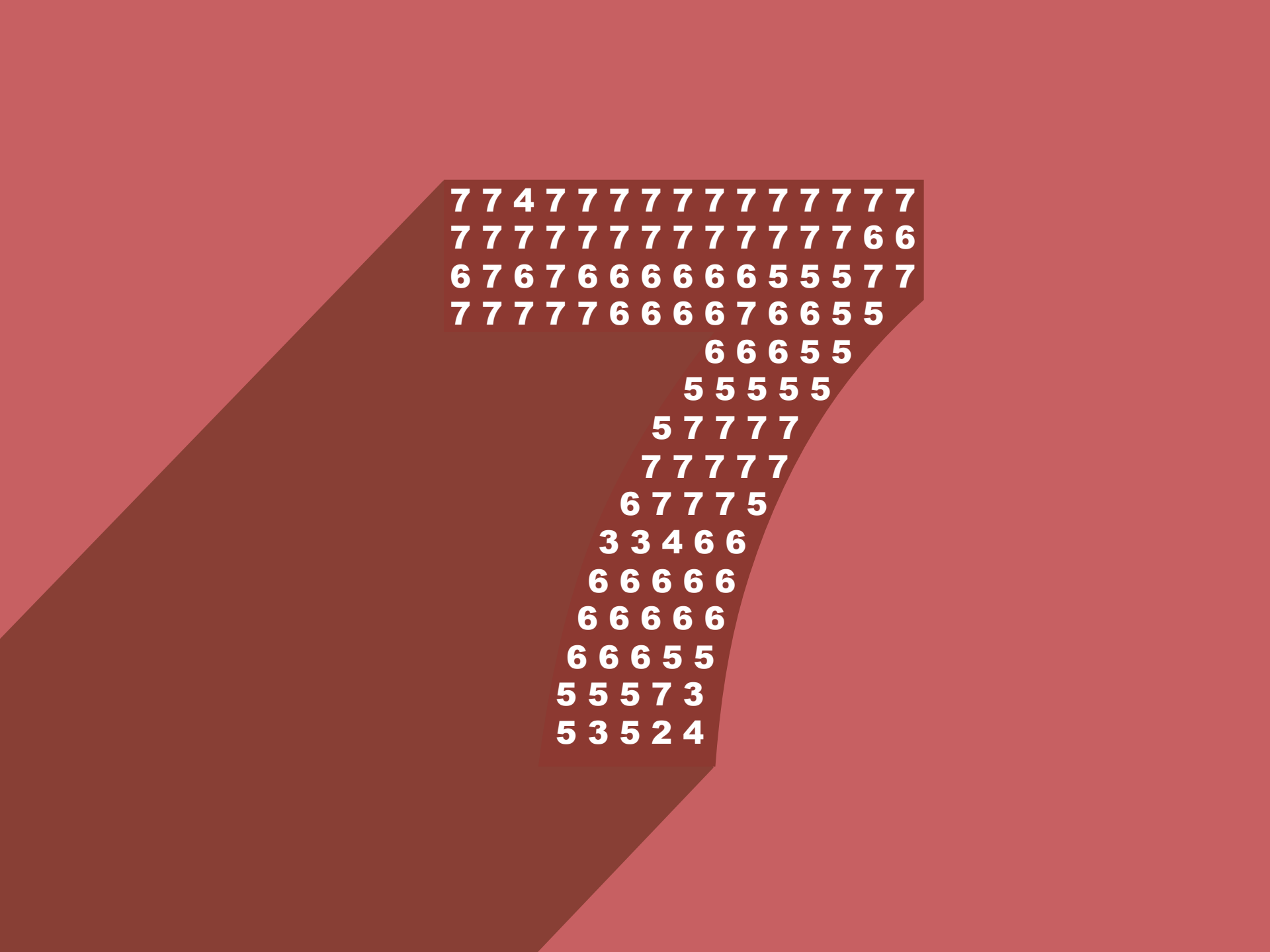
Ideen I/O

- Effizientere Checkpoints
  - minimale Schnitte im Baum, aber das liefert die Queue sogar schon.
- Komprimierung
  - Daten haben relativ geringe Entropie?, Unterstützt werden sollte auch das durch die Tiefensuche (666123, 666213, 666163 ...)
- Worker speichern Daten bei sich selbst.

Sonstiges

- Eingeschränkte Suchräume, beste Ergebnisse eines eingeschränkten Suchraums werden dann weiter benutzt.
- Betrachte nicht nur beendete Spiele, sondern auch Spiele die schon einen hohen Score haben.

7


7 7 4 7 7 7 7 7 7 7 7 7 7 7
7 7 7 7 7 7 7 7 7 7 7 7 6 6
6 7 6 7 6 6 6 6 6 5 5 5 7 7
7 7 7 7 7 6 6 6 6 7 6 6 5 5
6 6 6 5 5
5 5 5 5 5
5 7 7 7 7
7 7 7 7 7
6 7 7 7 5
3 3 4 6 6
6 6 6 6 6
6 6 6 6 6
6 6 6 5 5
5 5 5 7 3
5 3 5 2 4