

Option 1 Mining

Option 1.1 Ladder up or down

Choose 1 (Ladder up or down) and Enter:

```
Choose (t+h = help +i = items eg 3h):
1) Ladder up or down
2) Stairs up or down
3) Create mine at this level
4) Safe drop to water block
5) Single column bubble lift
6) QuickMine corridor system
7) QuickMine rectangle
8) Mine bedrock level
9) Rob disused mineshaft
Back = 'q' or number + Enter: _
```

The help screen is automatically loaded

Press Enter to select direction
(see next page for details)

```
Place me on the ground at ^
The ladder will start at this level
and go up or down.
```

```
| | | | |
| | |x| | | x = Ladder support block
| | |L| | | L = Ladder
| | |^| | | ^ = Turtle
| | | | | |
```

Enter to continue

Alternatively:

Pressing 1h will open the above help screen, but with a different prompt.

This will optionally allow you to see what items are required:

Press any key and Enter eg 'i'

This is a list of items required for ladder

Press Enter to exit this page:

```
Items required:
ladder from this level up / down
levels/4 torch (optional)
(levels×4 stone
Enter to continue_
```

This menu gives 4 options

Continue with the selection eg Ladder

Return to sub-menu

Return to main menu

Give up and exit

```
Choose your option
1) Continue with selected task
2) return to menu
3) Return to main menu
4) Quit application
Type number + Enter: _
```

It is a good opportunity to decide whether you have all the required items and continue, or exit to fetch them

The items page can be selected directly with option number and 'i' eg 1i This will go immediately to start the selected task when you exit the items page.

The same choices are shown for ladders (option 1) and stairs (option 2) to choose the direction.

```
Which direction?  
1) Going down  
2) Going up  
Type number + Enter
```

Ladder down

Use F3 or a map mod to find the current Y. Enter it here.

```
Current level (F3->Y coord)?
```

Enter the level you want to go down. The min/max values are automatically adjusted for MC version to reach bedrock.

```
Current level (F3->Y coord)? 66  
Go down to level? (64 to -59) 56
```

66 to 56 as chosen here should place 10 ladders down.

```
Current level (F3->Y coord)? 66  
Go down to level? (64 to -59) -59  
Build a shelter at base? (y/n) n  
Are you in air or nether? (y/n) n
```

You can choose to build a small enclosure at the base of the ladder.

The air/nether question requests more solid blocks to surround the ladder structure if it is likely to go into lava or require additional guard blocks in the air to prevent falling.

The Inventory request pages show next to gather supplies.

```
Add 1 bucket to any slot(s)  
(Optional: 'Enter' if not required)
```

Optional items are indicated, but non-optimal can be over-ridden with smaller quantities if required.

A bucket is used to refuel in lava (optional)

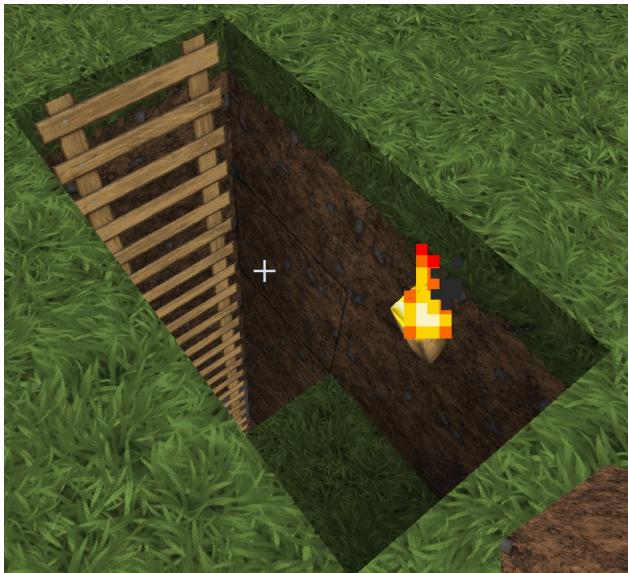
```
Add 10 ladder to any slot(s)
```

After adding 10 ladders and 2 torches, you can risk not adding any stone if the chance of water or lava below is slim.

```
Add 10 stone to any slot(s)
```

Just press Enter to continue

If it runs out of ladders the turtle will pause with a request for estimated amount required to complete.



This ladder extends 10 blocks down.

The turtle is at the bottom and can be recovered or used in-place to continue the ladder downwards.

As the shelter offer was refused, it just stays at the bottom of the ladder.

To extend the ladder further, just repeat the stages above.

Ladder up

Introduction to go.lua command

To move the turtle along from it's current position to make a ladder back to the surface use the following command directly in the console. (NOT from the tk toolkit)

go x0R1F1x0F1x0L1



```
> go x0R1F1x0F1x0L1_
```

This uses the go method from the turtle class passing a string to represent the actions to be taken:
x = eXcavate (dig) + the direction 0 (up), 1 (forward), 2 (down)

R = turnRight, L = turnLeft, F = Forward + the number of turns

x0 = dig up
R1 = turn Right
F1 = Forward 1
x0 = dig up
F1 = Forward 1
x0 = dig up
L1 = turnLeft



The turtle is now in position to place a ladder up. Follow the steps above until the direction option then select 2 Going up

```
Which direction?  
1) Going down  
2) Going up  
Type number + Enter
```

This time, start at level 56 and go up to 66 Again the max height is calculated based on Minecraft version

```
Current level (F3->Y coord)? 56  
Go up to level? (58 to 319) 66  
Are you in air or nether? (y/n) n
```

Ladder base level 56



Completed ladder down (left) and ladder up (right)

The ladder can be extended up by repeating the stages above.

Blocks will be placed to surround the ladder on the left and right

Level 66 entered as start, 70 to reach. These are the Player levels NOT the turtle level

Note the 'y' answer to
'Are you in the air or nether?' question



```
Current level <F3->Y coord? 66
Go up to level? (68 to 319) 70
Are you in air or nether? (y/n) y
```

We have asked to go up 4 levels (66 to 70) and 16 stone was requested based on 4 per level.

The turtle was actually on level 65 at the start, and has gone up to level 69 (4 levels as requested)

Note how the ladder is surrounded by stone including the ground level, which was originally surrounded by dirt/grass blocks



Option 1.2 Stairs up or down

The procedure is exactly the same as for ladder up/down. The only difference is the items required. If you do not supply stairs, then the turtle will craft them from any stone in it's inventory.

The central column stands 2 blocks above the finish level.

Some manual tidying up will be required.

If the stairs are going down, the turtle digs vertically straight down, first, then builds the stairs from the ground up.



Manual completion of surrounding wall,
reduction of column and replacing dirt with
cobble.

Torches can be placed on every 4th corner block
along the staircase

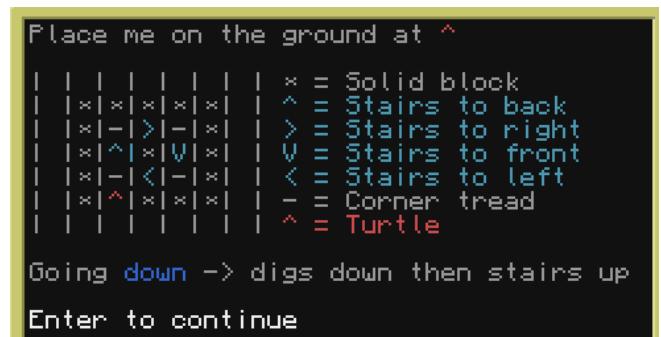


start tk

Option 1. Mining

Option 2 Stairs up or down

The help screen auto-loads to help place the turtle appropriate to the resulting staircase



Pressing Enter loads the same up or down menu as used with ladders

Project: Diamond Mine

The preferred method of creating a deep (diamond) mine is to use 1.1 ladder up or down and choose bedrock as the destination (5 or -59 depending on MC version)

Follow the guide above for ladder down

This time select 'y' when asked about the shelter at the base

```
Current level (F3->) Y coord?? 66
Go down to level? (64 to -59) -59
Build a shelter at base? (y/n) y
Are you in air or nether? (y/n) n_
```

Typically you will need

1. 2 stacks of ladders,
2. 2 stacks of cobble / deepslate
3. half stack of torches



The completed ladder

with base shelter:



Typically more diamonds are found in the 9 layers above bedrock.

The turtle just needs to be rotated 180 degrees to create the first auto-mine as follows:

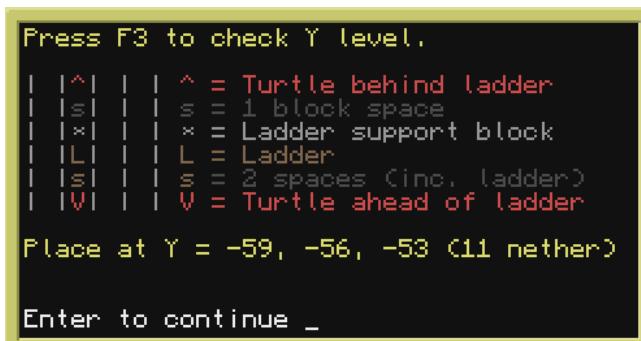
use 'R 2' or 'L 2' in the console to rotate the turtle (NOT from tk)

Option 1.3 Create a mine at this level

This screenshot shows the ideal position:

It allows stacking of the mines every 3 levels
as far up as you want to go.

The most productive levels are indicated.



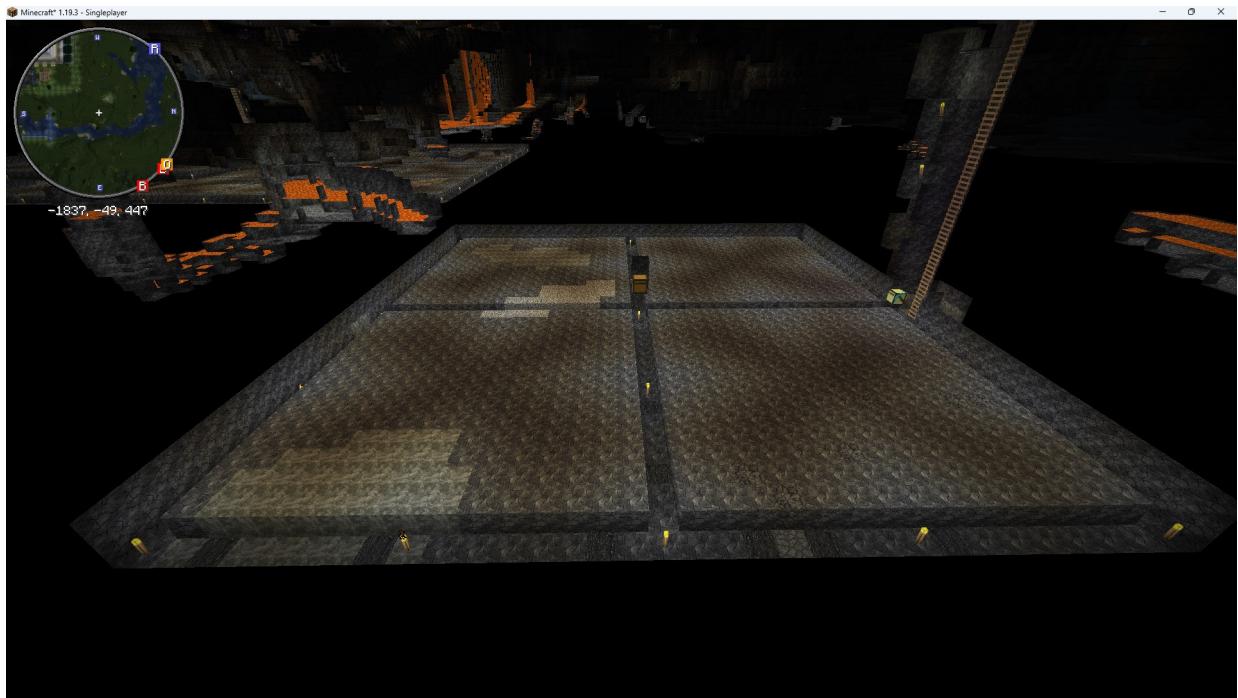
1. Start tk
2. Choose option 1 Mining
3. Choose Option 3 Create a mine at this level

The above help screen shows.

It will ask for the following inventory items:

1. 24 Torch – to place at set positions
2. 1 bucket – to use for refuelling if entering lava
3. 64 stone – reserve for filling in voids in the path or ceiling
4. 1 chest – placed at the ceiling centre of the mine to store low value items

It will take around 45 minutes to create the mine which looks like this:



The mine is 33 x 33 blocks with a surrounding corridor. There are 2 further corridoors crossing through it. The rest is 1 block high, with valuables stripped out over 3 layers: celing, eye level and foot level

Great thing is you can leave it to its own devices while you do other things, but keep within the loaded chunks otherwise the program will stop.

Results of this demo of the mine above:



Repeat the process on the other side of the ladder column, then go up 3 blocks, rinse and repeat. 6 of these mines can produce a full stack of diamonds or more.

Option 1.4 Safe drop to water block

Getting down the ladder of around 120 blocks can take some time so the next step is to create a single block sized hole down to bedrock, place water at the bottom, then simply jump in...

Start next to the ladder:



Start tk

Choose option 1 Mining

Choose Option 4 Safe drop to water block

The help screen auto-loads:

Press Enter

```
Turtle goes DOWN to chosen level  
enclosing all sides of the column.  
Water placed at bottom. Returns here.  
If next to a ladder, place as below:
```

```
| | | | | | x = Ladder support block  
| | | | | | ^ | L | ^ | L = ladder  
| | | | | | | | ^ = Turtle facing forward
```

Enter to continue

Enter current and desired levels:

```
Current level (F3->Y coord)? 66  
Go down to level? (64 to -59)-59
```

The Inventory will ask for the height * 2 blocks

Add what you can, and press Enter to

over-ride the request.

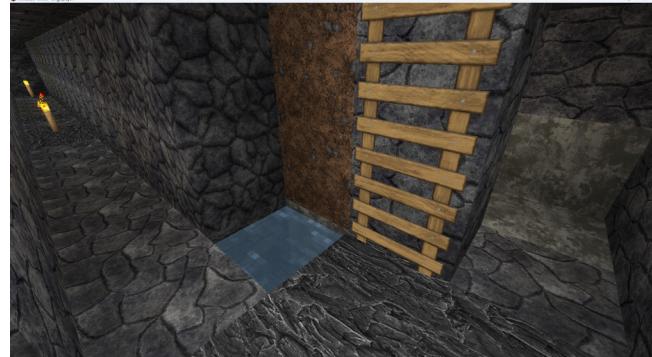
The turtle will return to this point.

The turtle rotates as it descends and places blocks anywhere there is air, water or lava so the shaft is fully surrounded by blocks.

Ladders are considered blocks, so by going next to a ladder the shaft can be used at any level by simply walking into it.

The finished water drop looks like this:

The dirt blocks were placed as part of the code
but can easily be removed.



The turtle has already returned to the surface,
back to it's starting position.



Option 1.5 Single column bubble lift

If you have already been to the Nether and have soul sand, then you can make a bubble lift.

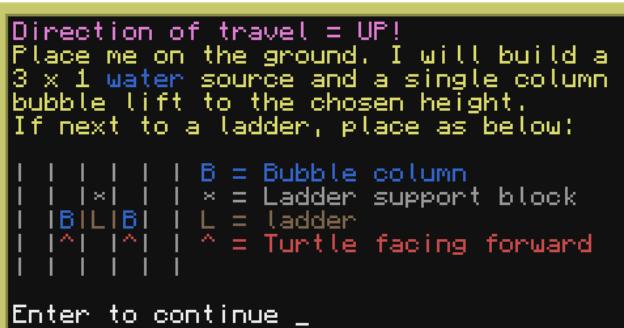
Place the turtle next to the ladder.

If you have already made a safe drop on one

side, then place it on the other side:

If you are at bedrock level (-59 / 5) then
the turtle will move up 2 places to create a water
source.

The help screen auto-loads:



Make sure you have 2 water buckets and as
many empty buckets (max 12) as possible.

The Inventory will prompt you for the maximum
number.

The stages of the code are shown here:

```
-- prepare source area and place soul  
sand
```

Next action

```
-- ready for water sources to be placed  
and fill buckets
```

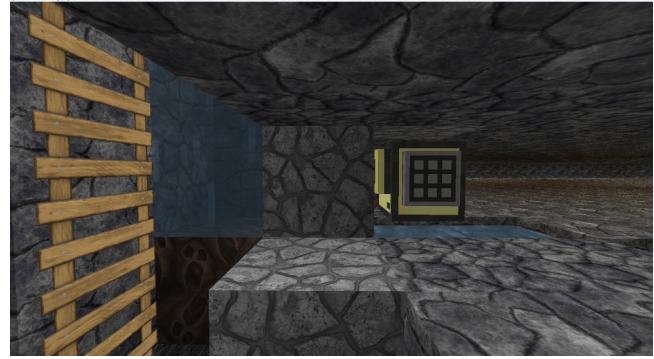
sources placed, buckets filled:

Next action:

```
-- build remaining lift
```



Completed base. Water column rises to the same height as the ladder



Manually modified top with cobbled deepslate border and reposition signs

Central ladder remains for scenic descent / ascent

Enjoy

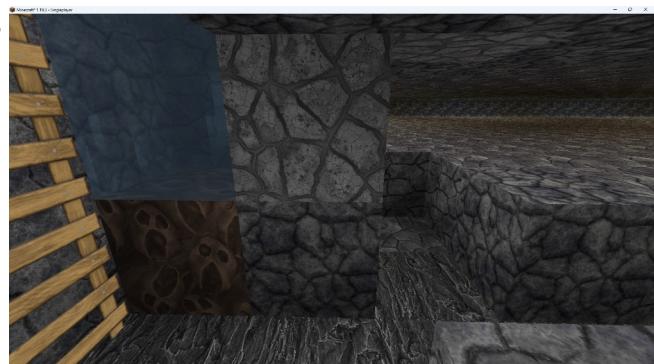


Note the cobble plug in the ceiling placed as the turtle descended.

Suggested alteration of base to allow for mine workings.

Take care with further mines to place the turtle 1 block further away from the ladder to protect the bubble column

View from bedrock looking up



Option 1.6 QuickMine Corridor system

This is the first part of a split of the automated process used earlier into two parts. *It is much faster than the auto-mine as checks are not made to seal water or lava.*

A rectangular corridor system is constructed with both floor and ceiling checked for voids.

The default size to match the automated system is 17 x 17 (a quarter of the auto-mine size)

These can be repeated as required to replicate the auto-mine.

The downside is if water or lava is encountered, it is left to the player to sort it out.

Place the turtle round the back of the ladder block to test this out.

From the console use:

f 1 d

to move forward into the wall:



1. Start tk
2. Menu → 1. Mining
3. Menu → 6h QuickMineCorridor Help
4. Or Menu → 6 to avoid help
5. Choosing 6i or any key + enter after 6h displays the items required:

```
Place me as below:  
1. On floor (feet height)  
2. On ceiling (eye height)  
  
BIBIBIBIBIBIB W I D T H  
BI | | | | IB L  
BI IBIBIBI IB E  
BI IBIBIBI IB N  
BI IBIBIBI IB G  
BI ^| | | | IB ^ = Turtle T  
BIPIBIBIBIB P = Player H  
  
Enter to continue
```

```
Items required:  
1 bucket (optional)  
64 stone  
Enter to continue
```

```
Width (2-64 default 17)  
Length (2-64 default 17)
```

```
Starting position?  
1) At corridor start, on the floor  
2) At corridor start, on the ceiling  
3) On floor, move forward to start  
4) On ceiling, move forward to start  
Type number (q to quit) + Enter 1
```

When asked for the width and length (of the rectangle) you can just hit Enter to accept the default value of 17

You are then given a list of starting positions.

As the turtle is already in place, option 1 is selected.

If it had been placed immediately behind the ladder column, then option 3 would have been chosen

The turtle moves forward 17 (or chosen amount) blocks, turns right 3 times to complete the rectangle



Example of possible danger:



Completed Corridor system:

From this position, the left side can be completed by rotating the turtle to the left (L command) and running the same tk menu item:

```
Thank you for using 'survival toolkit'  
> |  
Turned Left 1 times. Fuel: 54363  
>
```



Repairing a mine using direct commands

Remember the lava leak shown above?

Here is how to fix it safely:

Get as close as you can to the leak and place a block

Place the turtle on top and add a stack of any stone/ dirt etc.

The leak is on the left side



In the console type f (enter)

type L (Enter)

It is now facing the lava

Make sure the stone in the inventory is active and type

p 1

This will place cobble into the lava:



Use the commands

- f number forward
- l number left
- r number right
- d number down
- u number up
- p number place 0 or 1 or 2 up, forward, down

to fill all the leaks

Option 1.7 QuickMine Rectangle

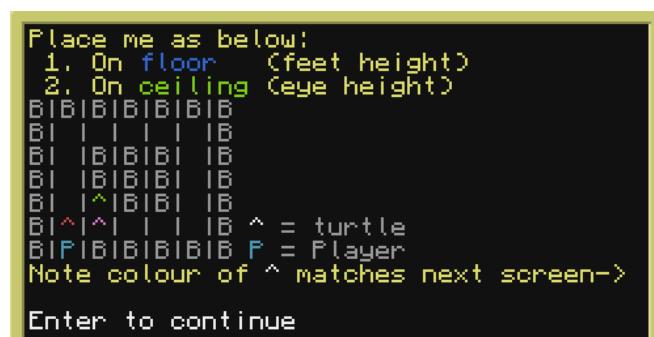
This option removes the top half of the blocks enclosed by the corridor rectangle.

Any valuable blocks above or below are mined.
The ceiling is NOT plugged if it has lava.

The turtle can remain in the floor position if a corridor system has just been completed:



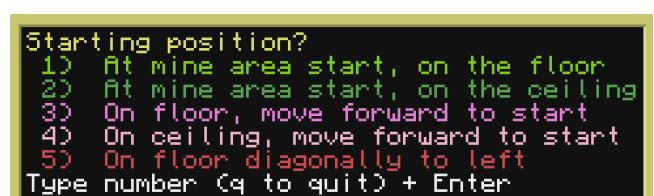
1. Start tk
2. Menu → 1. Mining
3. Menu → 7h QuickMineCorridor Help
4. Or Menu → 7 to avoid help
5. Choosing 7i or any key + enter after 6h displays the items required:



The help screen shows 3 positions to choose from. The screenshot shows the left of the two. The colour of the ^ symbol represents the following menu colours:

The default width and length is 15

When the start position menu shows:



Use 5 On floor diagonally left in this case

Mission complete!



Option 1.8 Mine Bedrock level

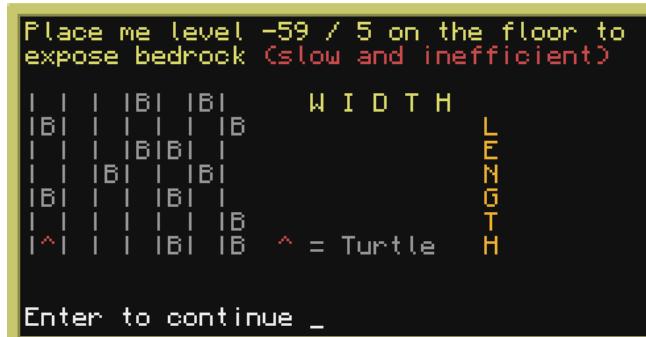
This function digs a specified rectangle down to bedrock and rotates as it goes, clearing all blocks as it goes.

Place the turtle on level -59 or (5 pre 1.12.2) and select sub-menu item 8

It takes a lot of time and fuel with very little valuable items gained, but can be done if desired.

An option is to leave the bedrock exposed, or back filled to leave a smooth floor.

Help screen



Here is an example of exposed 15x15 area:



Option 1.9 Rob disused mineshaft

Typical mineshaft is a 3 x 3 corridor:



Start tk

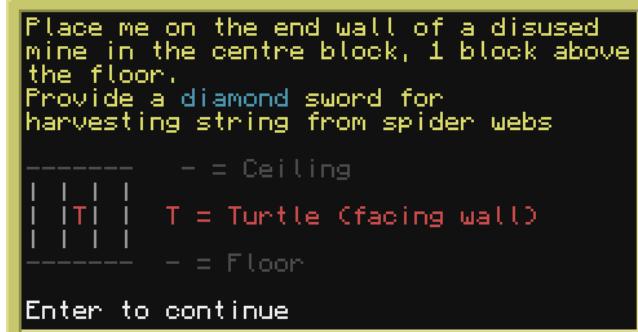
Choose option 1. Mining

Choose option 9. Rob disused mineshaft

(The term 'rob' comes from archaeological investigations, where articles are robbed from the site)

Help is automatic, so the help screen shows without needing to use 9h

9i shows inventory items:



Turtle ready to go:

It turns round and removes all items in it's path.

If a cobweb is detected and you supplied a sword, the sword is equipped to cut the cobweb into string.

It stops at the end of the third run

