technotes Documentation

Release 1

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CHAPTER

ONE

KID'S ACTIVITIES

1.1 Minecraft Pi Edition

1.1.1 Basic commands

W	move forward
S	move backward
A	move left
D	move right
E	show inventory of blocks
1-8	select items in the quick bar
Space / Ctrl + Space	jump (ascend in fly-mode)
Shift / Ctrl + Shift	sneak (descend in fly-mode)
ESC	pause / menu
left mouse	destroy blocks
right mouse	place blocks
double **Space**	fly / fall
Tab	release mouse

1.1.2 List of python programs

Short-cuts

Ctrl + S	save
F5	run

Display the player's position

```
from mcpi import minecraft

mc = minecraft.Minecraft.create()

x,y,z = mc.player.getTilePos()
mc.postToChat("x="+str(x)+", y="+str(y)+", z="+str(z))
```

Teleport (change the player's position)

In the following program, the player will be teleported 100 higher.

```
from mcpi import minecraft

mc = minecraft.Minecraft.create()

x,y,z = mc.player.getTilePos()
mc.player.setPos(x,y+100,z)
```

Build a huge block of activated TNTs

When you click one TNT, there will be an explosion around that block of TNTs.

```
from mcpi import minecraft

mc = minecraft.Minecraft.create()

x,y,z = mc.player.getTilePos()

tnt = 46
activated = 1
mc.setBlocks(x+1,y+1,z+1,x+5,y+5,z+5,tnt,activated)
```

Put a flower on the path

We will leave a flower when we are on a block of grass. Otherwise we will change the beneath block to a grass block.

```
from mcpi import minecraft
from time import sleep

mc = minecraft.Minecraft.create()

grass = 2
flower = 38
while True:
    x,y,z = mc.player.getTilePos()
    block_beneath = mc.getBlock(x,y-1,z)
    if block_beneath == grass:
        mc.setBlock(x,y,z,flower)
    else:
        mc.setBlock(x,y-1,z,grass)
    sleep(0.1)
```

Clear space with input size

We will clear space for a given **size**. To do so, we will build a cube of **size** x **size** x **size** blocks, filled with the AIR block.

```
from mcpi import minecraft, block

mc = minecraft.Minecraft.create()

x,y,z = mc.player.getTilePos()
size = int(raw_input("size of area to clear? "))
if size > 0:
    mc.setBlocks(x,y,z,x+size,y+size,z+size,block.AIR.id)
```

Challenge: Change a little the above program so that the player is in the middle of the cleared space (and also dig down a few blocks).

Build a house, then a street

```
from mcpi import minecraft, block

mc = minecraft.Minecraft.create()
SIZE = 20

def house():
    midx = x + SIZE/2
    midy = y + SIZE/2
    mc.setBlocks(     x,        y,   z,   x+SIZE,   y+SIZE,   z+SIZE,block.COBBLESTONE.id)
    mc.setBlocks(   x+1,      y+1,z+1,x+SIZE-1,y+SIZE-1,z+SIZE-1,         block.AIR.id)
    # left window
    mc.setBlocks(   x+3,y+SIZE-3,   z,   midx-3,   midy+3,        z,       block.GLASS.id)
    # right window
    mc.setBlocks(midx+3,y+SIZE-3,   z,x+SIZE-3,   midy+3,        z,       block.GLASS.id)
    # door
    mc.setBlocks(midx-3,        y,   z,   midx+3,    midy,        z,  block.DOOR_WOOD.id)
    mc.setBlocks(     x,  y+SIZE,   z,   x+SIZE,   y+SIZE,   z+SIZE,        block.SNOW.id)
    mc.setBlocks(   x+1,      y+1,z+1,x+SIZE-1,     y+1,z+SIZE-1,        block.WOOL.id,7)

x,y,z = mc.player.getTilePos()

# build a house
house()

# build a street
for h in range(5):
    house()
    x = x+SIZE
```

1.2 Pygame

1.2.1 List of pygame programs

Draw a circle

```
import pygame

width,height = 640,480
radius = 100
fill = 1

pygame.init()
window = pygame.display.set_mode((width,height))
window.fill(pygame.Color(255,255,255)) # white

while True:
    pygame.draw.circle(window,
                       pygame.Color(255,0,0), # red
                       (width/2,height/2),
```

```
                        radius,
                        fill)
    pygame.display.update()
    if pygame.QUIT in [e.type for e in pygame.event.get()]:
        break
```

Draw circles based on mouse move / position

```
import pygame
from pygame.locals import *

width,height = 640,640
radius = 0
fill = 1
mouseX,mouseY = 0,0

pygame.init()
window = pygame.display.set_mode((width,height))
window.fill(pygame.Color(255,255,255)) # white
fps = pygame.time.Clock() # FPS = Frame Per Second

while True:  # one frame per loop
    for event in pygame.event.get():
        if event.type == MOUSEMOTION:
            mouseX,mouseY = event.pos
        if event.type == MOUSEBUTTONDOWN: # mouse click
            window.fill(pygame.Color(255,255,255)) # clear screen
        radius = (abs(width/2 - mouseX) + abs(height/2 - mouseY))/2 + 1
        pygame.draw.circle(window,
                           pygame.Color(255,0,0), # red
                           (mouseX,mouseY),
                           radius,
                           fill)
    pygame.display.update()
    if pygame.QUIT in [e.type for e in pygame.event.get()]:
        break
    fps.tick(30) # wait so that frame rate is 30 fps
```

1.3 Scratch

CHAPTER

TWO

HARDWARE

2.1 Raspberry Pi

2.1.1 Default settings

login	**pi**
password	**raspberry**
hostname	**raspberrypi**
keyboard	UK

2.1.2 Basic commands

Config

```
$ sudo raspi-config
```

Start X server

```
$ startx
```

Reboot

```
$ sudo reboot
```

Shutdown

```
$ sudo shutdown -h now
```

Change datetime

```
$ sudo date --set="Sun Nov 18 1:55:16 EDT 2012"
```

Update

```
$ sudo apt-get update
$ sudo apt-get upgrade
```

2.1.3 Information

Check OS version

```
$ cat /proc/version
```

Check board version

```
$ cat /proc/cpuinfo
```

Display network interface and associated IP addresses

```
$ ifconfig
```

2.1.4 Short-cuts

Ctrl + C	kill currently running program
Ctrl + D	exit shell
Ctrl + A	move cursor to the beginning of the line
Ctrl + E	move cursor to the end of the line
Ctrl + Alt + Backspace	[optional] terminate the X server

2.1.5 Setup Keyboard

The default keyboard is UK. Let's change it to AU keyboard.

The trick is that Australia is not listed in the country list for the keyboard, we need to setup a US keyboard instead.

Change the keyboard config

```
$ sudo vi /etc/default/keyboard
```

```
XKBMODEL ="pc105"
XKBLAYOUT="us"
XKBVARIANT=""
XKBOPTIONS=""

BACKSPACE="guess"
```

Then run the following commands and reboot

```
$ sudo setxkbmap -layout us
$ sudo udevadm trigger --subsysstem-match=input --action=change
```

2.1.6 Utilities / Softwares

raspi-config tool

```
$ sudo apt-get install raspi-config
```

Minecraft

```
$ sudo apt-get install minecraft-pi
```

Screenshot : scrot

```
$ sudo apt-get install scrot
```

Mercurial

```
$ sudo apt-get install mercurial
```

2.2 Arduino

CHAPTER

THREE

SYSTEM

3.1 Linux

3.2 Windows

3.2.1 Connect to Internet via Ethernet cable (from PC/laptop)

Control Panel –> Network and Internet –> Network Connections

Ctrl + select local and wireless connections, right click **Bridge Connections**

CHAPTER

FOUR

PROGRAMMING LANGUAGE

4.1 Python