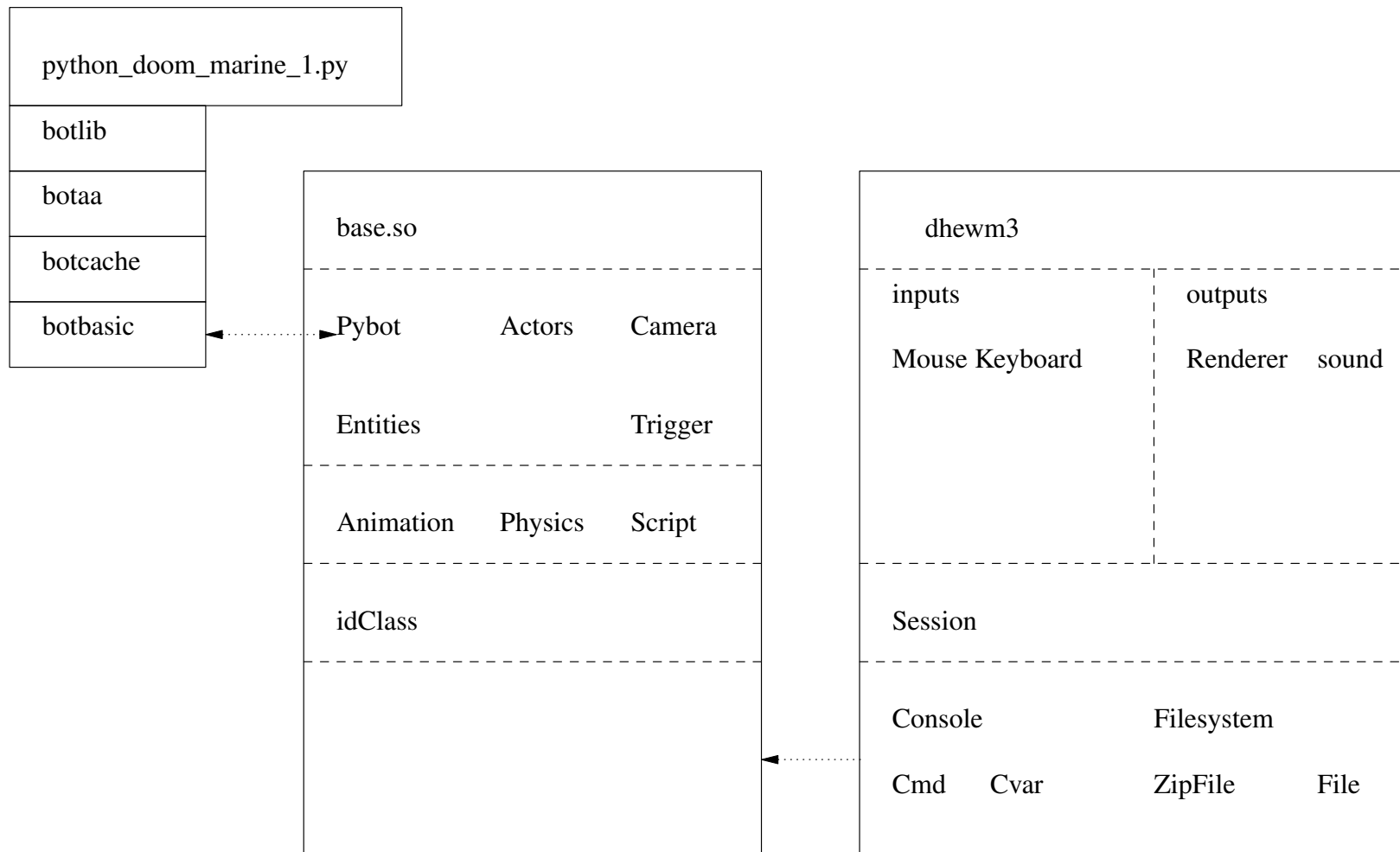


John Romero Programming Proverbs

- 9. “Encapsulate functionality to ensure design consistency. This minimizes mistakes and saves design time.”
- John Romero, “The Early Days of Id Software - John Romero @ WeAreDevelopers Conference 2017”

Implementing Select Weapon in the Python API



Implementing Select Weapon in the Python API

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/python-bot/botbasic.py`

```
#  
# changeWeapon - change to weapon, n.  
#               Attempt to change to weapon, n.  
#               n is a number 0..maxweapon  
#               The return value is the amount  
#               of ammo left for the weapon  
#               >= 0 if the weapon exists  
#               or -1 if the weapon is not in  
#               the bots inventory.  
#
```

Implementing Select Weapon in the Python API

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/python-bot/botbasic.py`

```
def changeWeapon (self, n):  
    if debug_protocol:  
        print "requesting change weapon to", n  
    s = "change_weapon %d\n" % (n)  
    self.s.send (s)  
    l = self.getLine ()  
    if debug_protocol:  
        print "doom returned", l  
    return int (l)
```

Test code for the python bot

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/python-bot/python_doommarine_1.py`

```
b = botbasic.basic ("localhost", "python_doommarine_1")
print "success!  python doom marine is alive"
while True:
    for w in range (1, 8):
        print "attempting to change to weapon", w,
        print "dhewm3 returns", b.changeWeapon (w)
        time.sleep (3)
```

Pybot.cpp server side change

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/ai/pybot.cpp`

```
else if (idStr::Cmpn (data, "get_pair_name_entity ", 21) == 0)
    rpcGetPairEntity (&data[21]);
else if (idStr::Cmpn (data, "get_entity_pos ", 15) == 0)
    rpcGetEntityPos (&data[15]);
else if (idStr::Cmpn (data, "change_weapon ", 14) == 0)
    rpcChangeWeapon (&data[14]);
else
{
    gameLocal.Printf ("data = \"%s\\", len (data) = %d\\n", data, (int) strlen (data));
    ERROR ("unrecognised rpc command");
}
```

■ notice how we check for the appropriate method to call
rpcChangeWeapon by examining the first 14 characters of data

Method declaration in pybot.h

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/ai/pybot.h`

```
void rpcGetPairEntity (char *arg);  
void rpcGetEntityPos (char *data);  
void rpcChangeWeapon (char *data);  
int myid;  
char *name;
```

Implementation in pybot.cpp

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/ai/pybot.cpp`

```
/*
 * rpcChangeWeapon - attempt to change weapon to the number in data.
 *                  The amount of ammo is returned. -1 means no weapon.
 */

void pyBotClass::rpcChangeWeapon (char *data)
{
    if (protocol_debugging)
        gameLocal.Printf ("rpcChangeWeapon (%s) call by python\n", data);

    char buf[1024];
    int weapon = atoi (data);
    int ammo = -1;

    if (weapon >= 0)
        ammo = dictionary->weapon (myid, weapon);
    idStr::snPrintf (buf, sizeof (buf), "%d\n", ammo);
    if (protocol_debugging)
        gameLocal.Printf ("rpcChangeWeapon responding with: %s\n", buf);
    buffer.pyput (buf);
    state = toWrite;
}
```


dict::weapon

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/ai/pybot.cpp`

```
bool aim (int id, int enemy);  
int turn (int id, int angle, int angle_vel);  
void select (int id, int mask);  
int getHigh (void);  
int weapon (int id, int new_weapon);  
private:  
    item *entry[MAX_ENTRY];  
    int high;
```

dict::weapon

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/ai/pybot.cpp`

```
int dict::turn (int id, int angle, int angle_vel)
{
    return entry[id]->turn (angle, angle_vel);
}

/*
 *   weapon - change to new_weapon and return the amount of
 *             ammo for this weapon.  -1 if the weapon is not
 *             in the inventory.
 */

int int dict::weapon (int id, int new_weapon)
{
    return entry[id]->weapon (new_weapon);
}
```

item::weapon declaration

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/ai/pybot.cpp`

```
int stepVec (int velforward, int velright, int dist);  
int start_firing (void);  
int stop_firing (void);  
int ammo (void);  
int weapon (int new_weapon);  
int health (void);  
void reload_weapon (void);  
bool aim (idEntity *enemy);
```

item::weapon implementation

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/ai/pybot.cpp`

```
/*  
 *  weapon - attempt to select weapon, new_weapon.  
 *           If successful return the amount of ammo else return -1.  
 */  
  
int item::weapon (int new_weapon)  
{  
    switch (kind)  
    {  
        case item_player:  
            return idplayer->ChangeWeapon (new_weapon);  
    }  
    assert (false);  
    return 0;  
}
```

idPlayer::weapon implementation

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/Player.cpp`

```
/*
=====
idPlayer::ChangeWeapon (gaius) (see StealWeapon)
=====
*/

int idPlayer::ChangeWeapon (int new_weapon)
{
    inventory.weapons = -1; // testing only!
    if (new_weapon >= 0 && new_weapon < MAX_WEAPONS)
    {
        if ((inventory.weapons & (1 << new_weapon)) != 0)
        {
            /*
             * player is carrying this weapon.
             */
            SelectWeapon (new_weapon, true);
            return inventory.ammo[currentWeapon];
        }
    }
    return -1;
}
```

idPlayer::weapon prototype

■ `$HOME/Sandpit/git-doom3/pybot-dhewm3/neo/game/Player.h`

```
int Ammo (void); // gaius
int Turn (int angle, int angle_vel); // gaius
void doTurn (int angle); // gaius
void select (int bitmask); // gaius
int ChangeWeapon (int new_weapon);

private:
```

Conclusion

- comment this code and see if you can extend the API to include other features