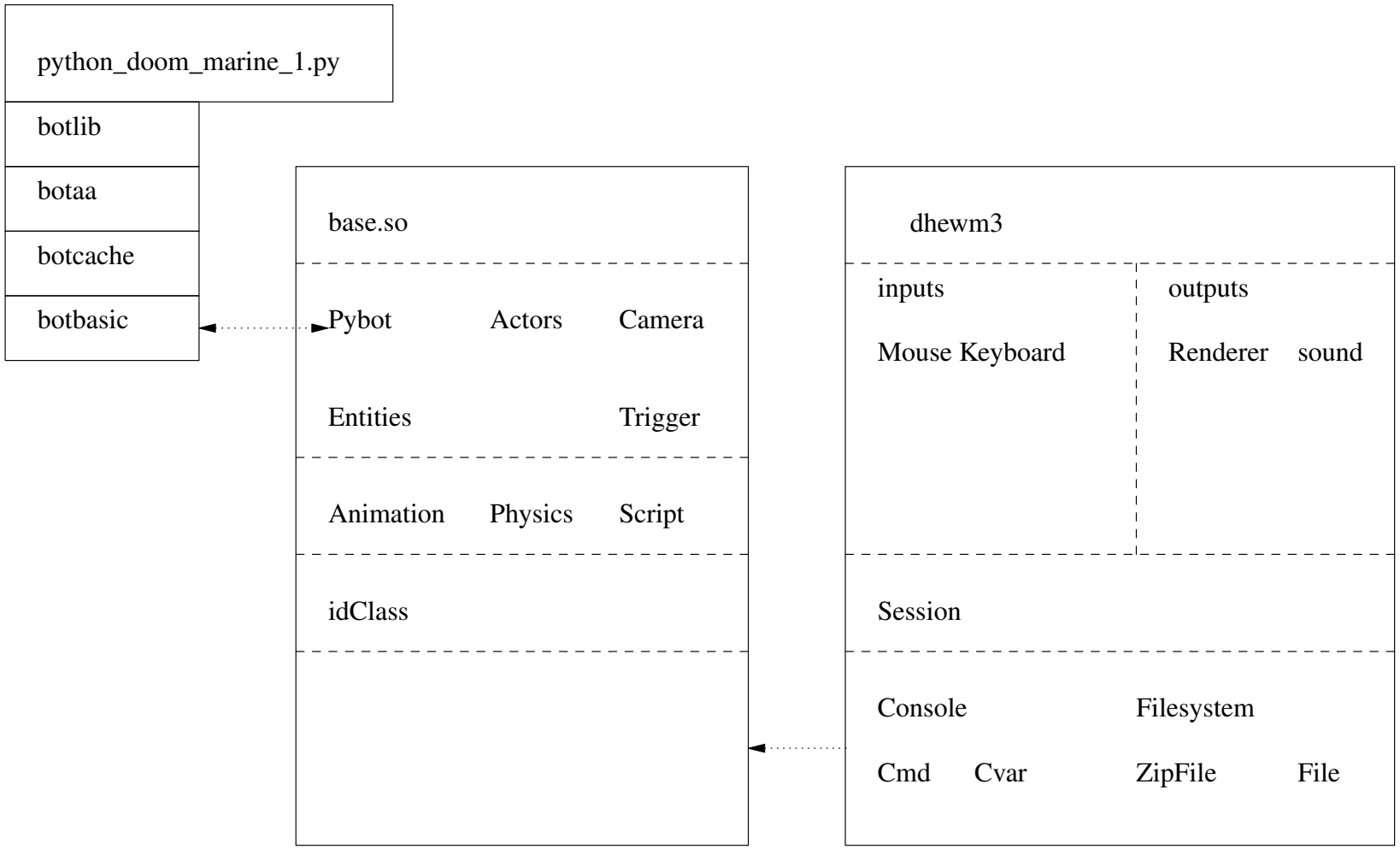
# John Romero Programming Proverbs

- 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