Bethesda Tutorial Packages

creationkit.com/index.php

Contents

Overview

This tutorial will show the reader how to set up packages (the data structures that control actor behavior) on an actor to get him moving around the world.

The reader will learn:

- How package stacks work
- How to create a simple daily schedule for an NPC
- How to create a new package

Packages and Package Stacks

A Package is the term used in the Creation Kit for the data structure that controls an actor's behavior. At any given time, an actor is always running one and only one package, which is what tells that actor what to do - sleep, eat, wander around, follow a patrol route, work a blacksmith's forge, etc.

So how does an actor know which package he should be running at any given time? That's where the Package Stack comes in. The basic idea is that each actor has a stack of packages that it could run. The game periodically runs down the list of packages, starting with the package at the top of the stack, and checks each package one at a time to see if it is currently valid. A package is valid if:

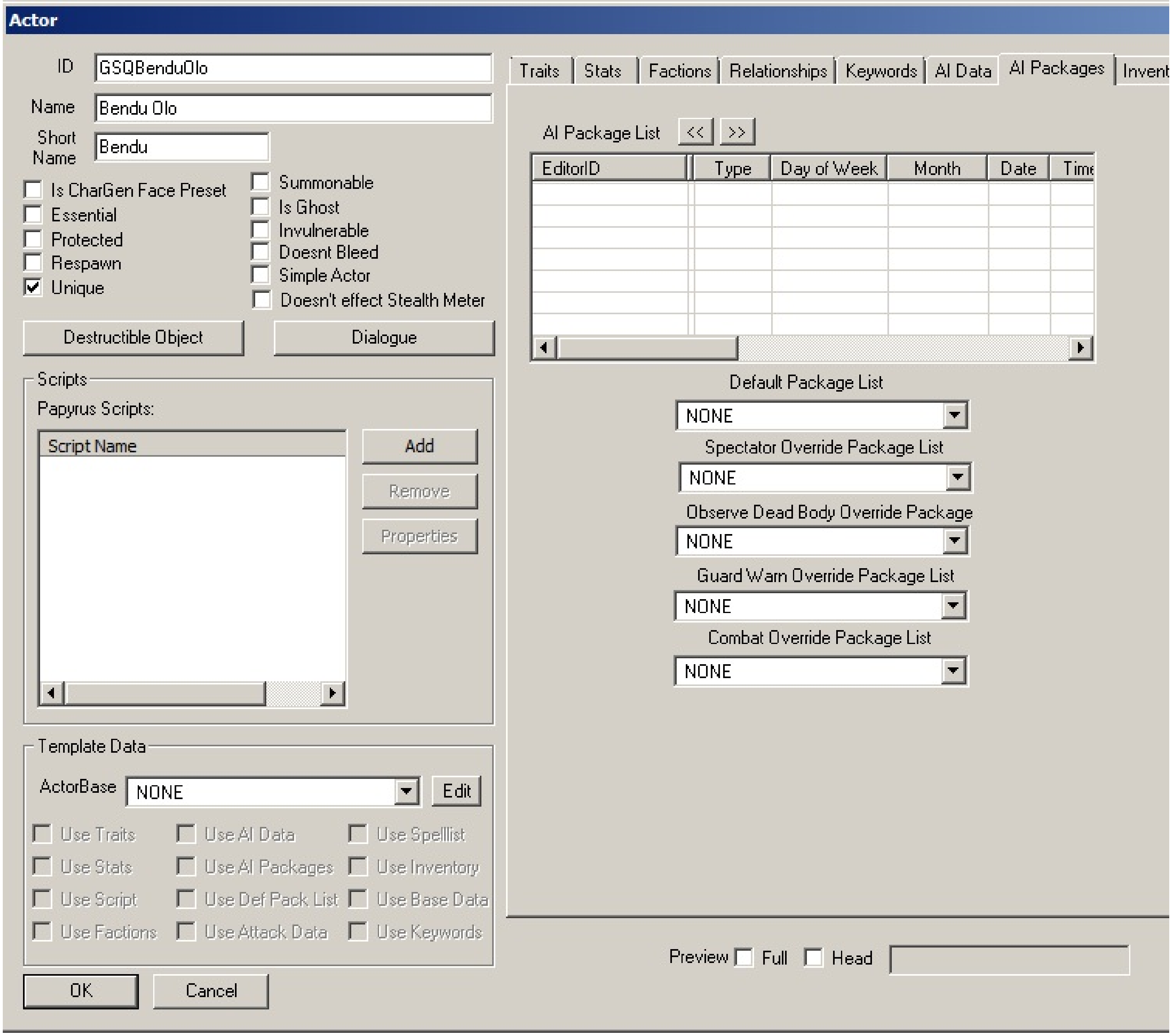
- Its conditions evaluate to true, and
- The current time of day falls within its schedule.

An actor always runs the first valid package in the package stack. Actors near the player will reevaluate their package stack very frequently; actors in unloaded areas of the game world less frequently.

Creating a Simple Schedule

So let's see how these ideas play out in practice by giving our old friend Bendu Olo a schedule. (Complete the Creating an Actor tutorial before continuing.)

Open GSQBenduOlo and go to the AI Packages tab, which currently looks like this:



ID GSQBenduOlo

Name Bendu Olo

Short Name Bendu

□ Is CharGen Face Preset
□ Essential
□ Protected
□ Respawn
☑ Unique
□ Summonable
□ Is Ghost
□ Invulnerable
□ Doesnt Bleed
□ Simple Actor
□ Doesn't effect Stealth Meter

Scripts

Papyrus Scripts:

Script Name

Template Data

ActorBase NONE

□ Use Traits □ Use AI Data □ Use Spellist
□ Use Stats □ Use AI Packages □ Use Inventory
□ Use Script □ Use Def Pack List □ Use Base Data
□ Use Factions □ Use Attack Data □ Use Keywords

AI Package List

EditorID	Type	Day of Week	Month	Date	Time

Default Package List NONE

Spectator Override Package List NONE

Observe Dead Body Override Package NONE

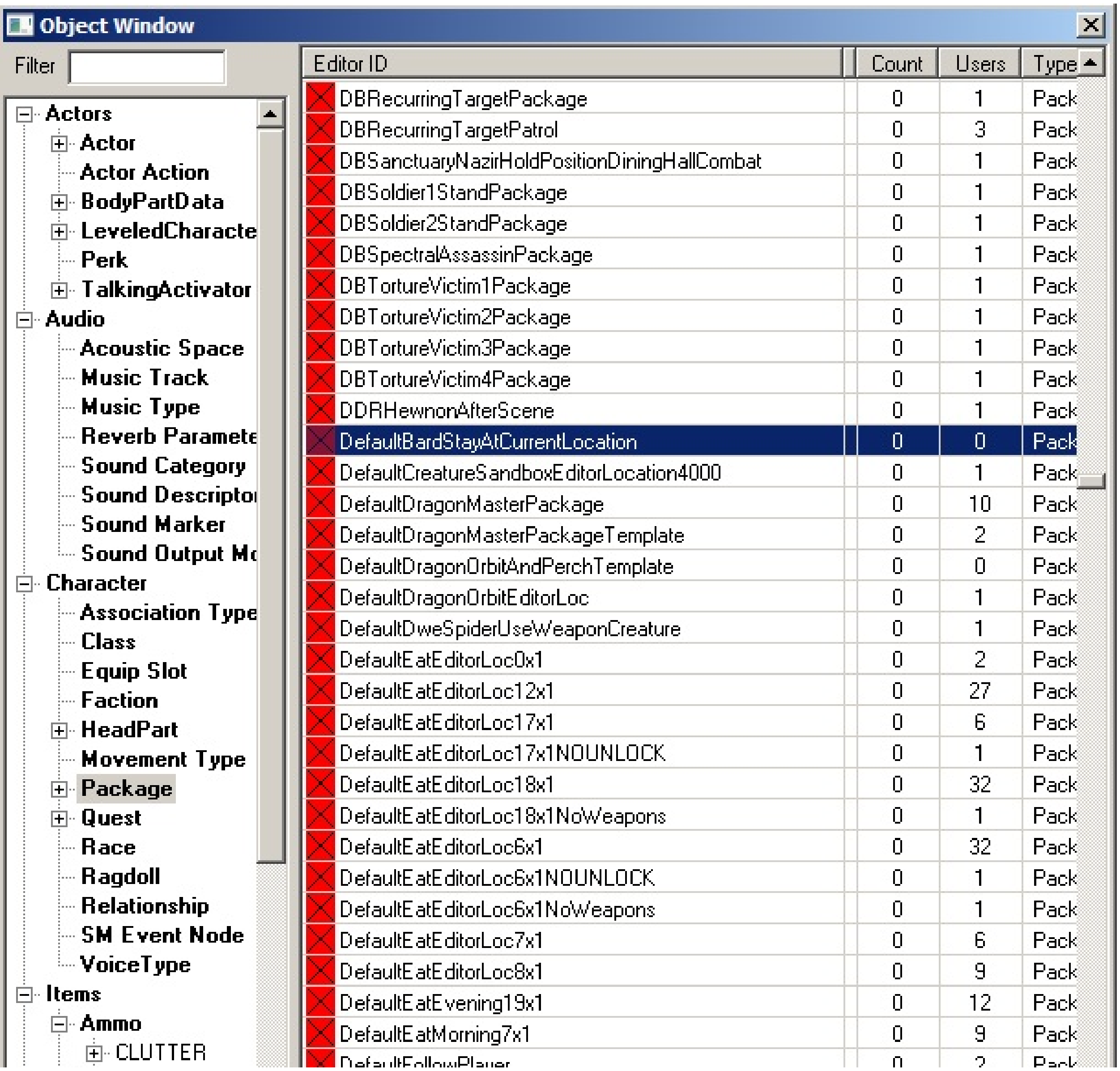
Guard Warn Override Package List NONE

Combat Override Package List NONE

Preview □ Full □ Head

Since he has no packages at all in his list, he'll simply stand in place all day long. Let's give him something to do, so he seems more like a human being.

To add packages to an actor, you can right-click on the Package List and select "Add", or drag packages into the list from the Object Window. Let's do the latter - select Package in the Object list (under the Character section). Scroll down to the packages named "Default...". (This is a naming convention we use to indicate packages that are not tied to a particular spot in the world, and thus can be used by any actor.)

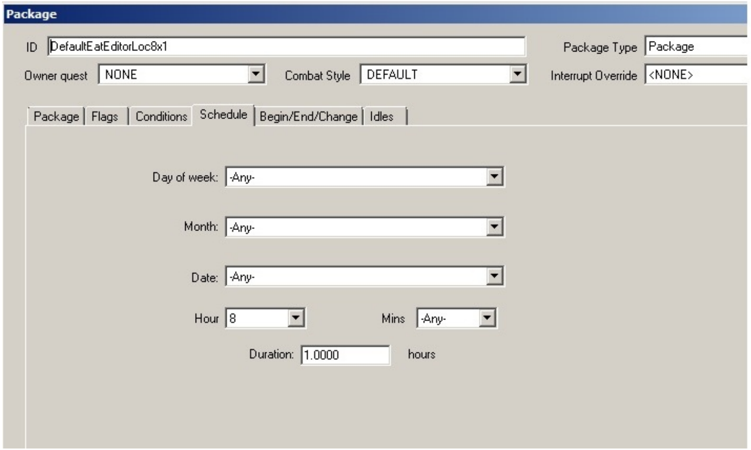


Editor ID	Count	Users	Type
DBRecurringTargetPackage	0	1	Pack
DBRecurringTargetPatrol	0	3	Pack
DBSanctuaryNazirHoldPositionDiningHallCombat	0	1	Pack
DBSoldier1StandPackage	0	1	Pack
DBSoldier2StandPackage	0	1	Pack
DBSpectralAssassinPackage	0	1	Pack
DBTortureVictim1Package	0	1	Pack
DBTortureVictim2Package	0	1	Pack
DBTortureVictim3Package	0	1	Pack
DBTortureVictim4Package	0	1	Pack
DDRHewnonAfterScene	0	1	Pack
DefaultBardStayAtCurrentLocation	0	0	Pack
DefaultCreatureSandboxEditorLocation4000	0	1	Pack
DefaultDragonMasterPackage	0	10	Pack
DefaultDragonMasterPackageTemplate	0	2	Pack
DefaultDragonOrbitAndPerchTemplate	0	0	Pack
DefaultDragonOrbitEditorLoc	0	1	Pack
DefaultDweSpiderUseWeaponCreature	0	1	Pack
DefaultEatEditorLoc0x1	0	2	Pack
DefaultEatEditorLoc12x1	0	27	Pack
DefaultEatEditorLoc17x1	0	6	Pack
DefaultEatEditorLoc17x1NOUNLOCK	0	1	Pack
DefaultEatEditorLoc18x1	0	32	Pack
DefaultEatEditorLoc18x1NoWeapons	0	1	Pack
DefaultEatEditorLoc6x1	0	32	Pack
DefaultEatEditorLoc6x1NOUNLOCK	0	1	Pack
DefaultEatEditorLoc6x1NoWeapons	0	1	Pack
DefaultEatEditorLoc7x1	0	6	Pack
DefaultEatEditorLoc8x1	0	9	Pack
DefaultEatEvening19x1	0	12	Pack
DefaultEatMorning7x1	0	9	Pack
DefaultFollowPlayer	0	2	Pack

We can build a simple schedule for Bendu Olo using these premade packages. Let's say we want him to eat breakfast and dinner at home, sleep at night, and otherwise just hang around his house.

For eating, let's check the existing default "eat" packages - let's pick **DefaultEatEditorLoc8x1** (breakfast) and **DefaultEatEditorLoc18x1** (dinner). Note: we use a naming convention to indicate packages which have a schedule: "STARTTIMExDURATION". So "8x1" indicates a package starting at 8 am and lasting for 1 hour; "18x1" indicates a package starting at 6 pm and also lasting for 1 hour. But of course the naming could be wrong - let's check the actual data on the packages to make sure their schedules match their names. 1 hour in game lasts 3 minutes in real life (20 minutes in-game equals 1 minute rl; 24h equals 72min).

Open the two packages and select their Schedule tabs, which look like this:


Package

ID DefaultEatEditorLoc8x1

Package Type Package

Owner quest NONE

Combat Style DEFAULT

Interrupt Override <NONE>

Day of week: -Any-

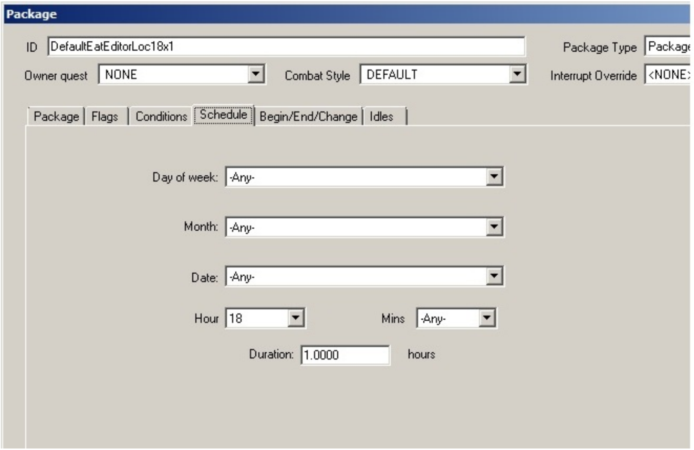
Month: -Any-

Date: -Any-

Hour 8

Mins -Any-

Duration: 1.0000 hours


Package

ID DefaultEatEditorLoc18x1

Package Type Packag

Owner quest NONE

Combat Style DEFAULT

Interrupt Override <NONE:

Day of week: -Any-

Month: -Any-

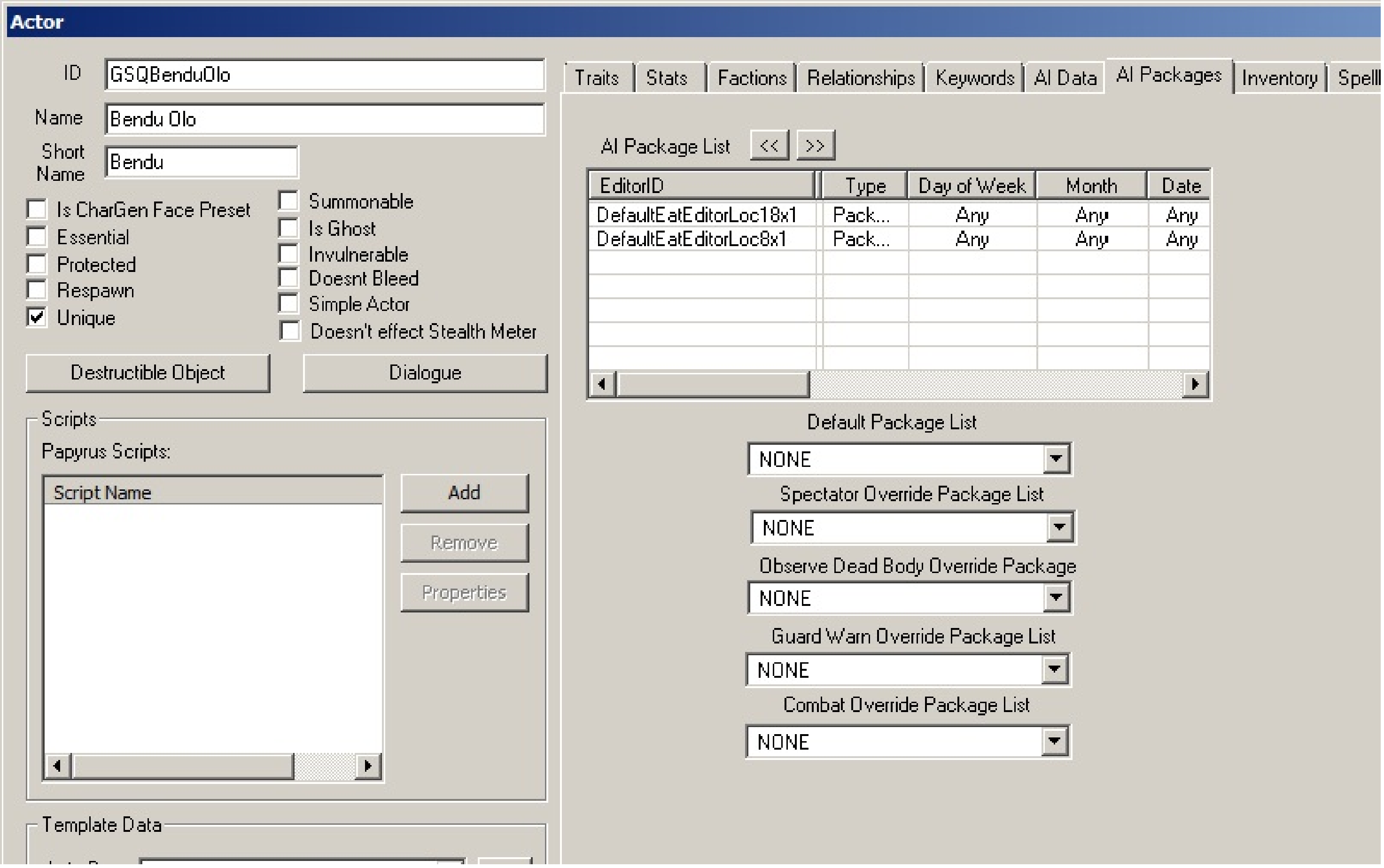
Date: -Any-

Hour 18

Mins -Any-

Duration: 1.0000 hours

Their names didn't lie - these packages are valid at the times we expected. Great, so let's add these to Bendu Olo's package list, which now looks like this:


Actor

ID GSQBenduOlo

Name Bendu Olo

Short Name Bendu

☐ Is CharGen Face Preset
☐ Essential
☐ Protected
☐ Respawn
☑ Unique
☐ Summonable
☐ Is Ghost
☐ Invulnerable
☐ Doesnt Bleed
☐ Simple Actor
☐ Doesn't effect Stealth Meter

EditorID	Type	Day of Week	Month	Date
DefaultEatEditorLoc18x1	Pack...	Any	Any	Any
DefaultEatEditorLoc8x1	Pack...	Any	Any	Any

Default Package List: NONE

Spectator Override Package List: NONE

Observe Dead Body Override Package: NONE

Guard Warn Override Package List: NONE

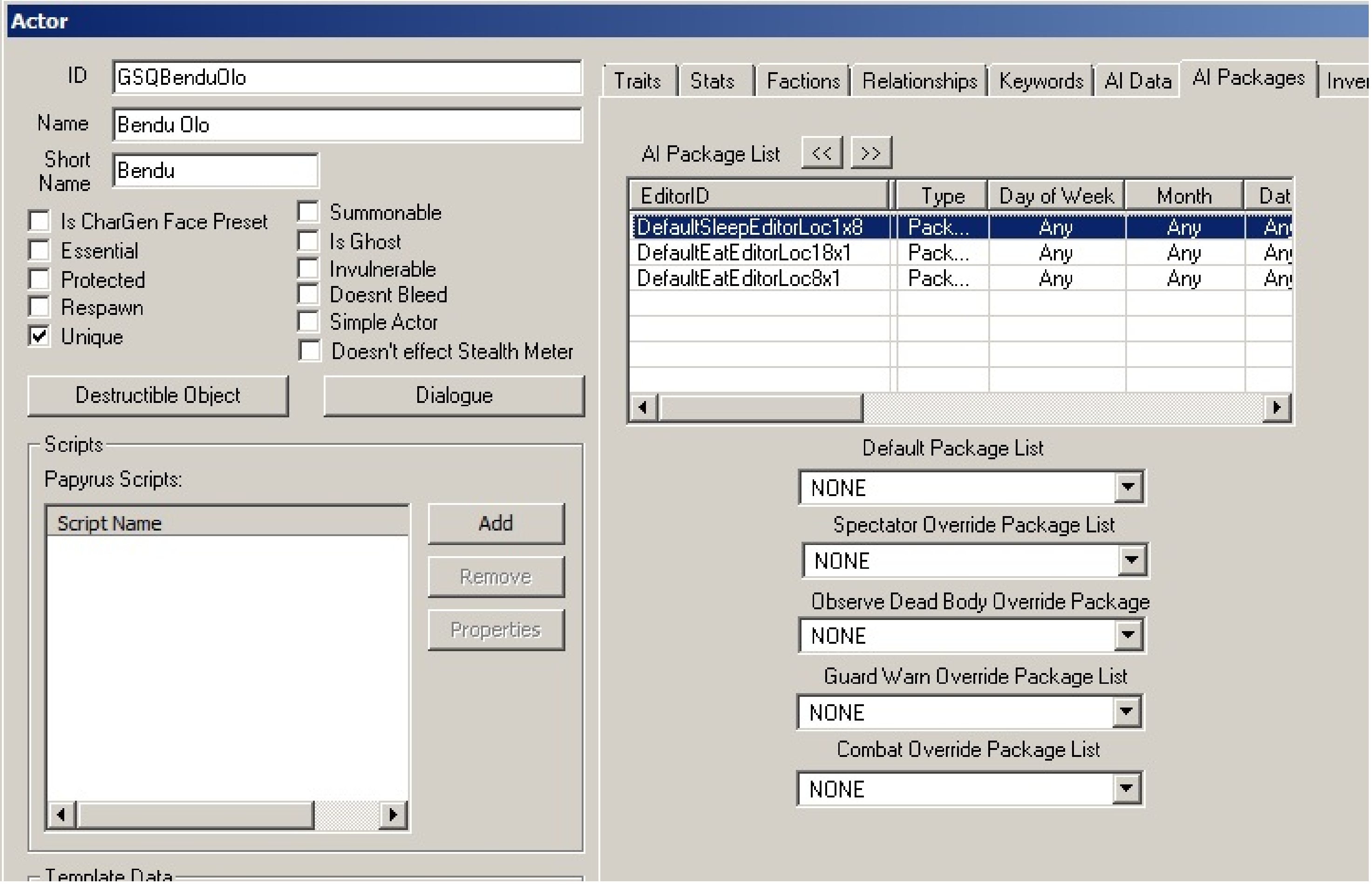
Combat Override Package List: NONE

Now as we discussed earlier, order is important in the package list, since the actor will always run the highest valid package in his list. For these two packages, however, it doesn't matter, because they are never valid at the same time - if it's between 8am and 9am, DefaultEatEditorLoc8x1 is valid; if it's between 6pm and 7pm, DefaultEatEditorLoc18x1 is valid; at any other time neither are valid. So the order of these packages doesn't matter. But stay tuned - for the next packages we add to Bendu Olo's list, the order will be crucial to making his schedule work correctly.

We said we wanted him to sleep at night, so let's find a sleep package in the "default" list - let's pick **DefaultSleepEditorLoc1x8**, which isn't actually the best choice but it will help illustrate the importance of stack order in the package list.

If you're paying close attention, you may have noted that this sleep package, which is valid from 1am to 9am, overlaps Bendu's breakfast package (DefaultEatEditorLoc8x1), which is valid from 8am to 9am. Here's where the order of the package stack starts to matter.

Say we put the sleep package at the top of Bendu's list, like this:



Actor

ID: GSQBenduOlo

Name: Bendu Olo

Short Name: Bendu

☐ Is CharGen Face Preset
☐ Essential
☐ Protected
☐ Respawn
☑ Unique

☐ Summonable
☐ Is Ghost
☐ Invulnerable
☐ Doesnt Bleed
☐ Simple Actor
☐ Doesn't effect Stealth Meter

AI Package List

EditorID	Type	Day of Week	Month	Dat
DefaultSleepEditorLoc1x8	Pack...	Any	Any	An
DefaultEatEditorLoc18x1	Pack...	Any	Any	An
DefaultEatEditorLoc8x1	Pack...	Any	Any	An

Default Package List: NONE

Spectator Override Package List: NONE

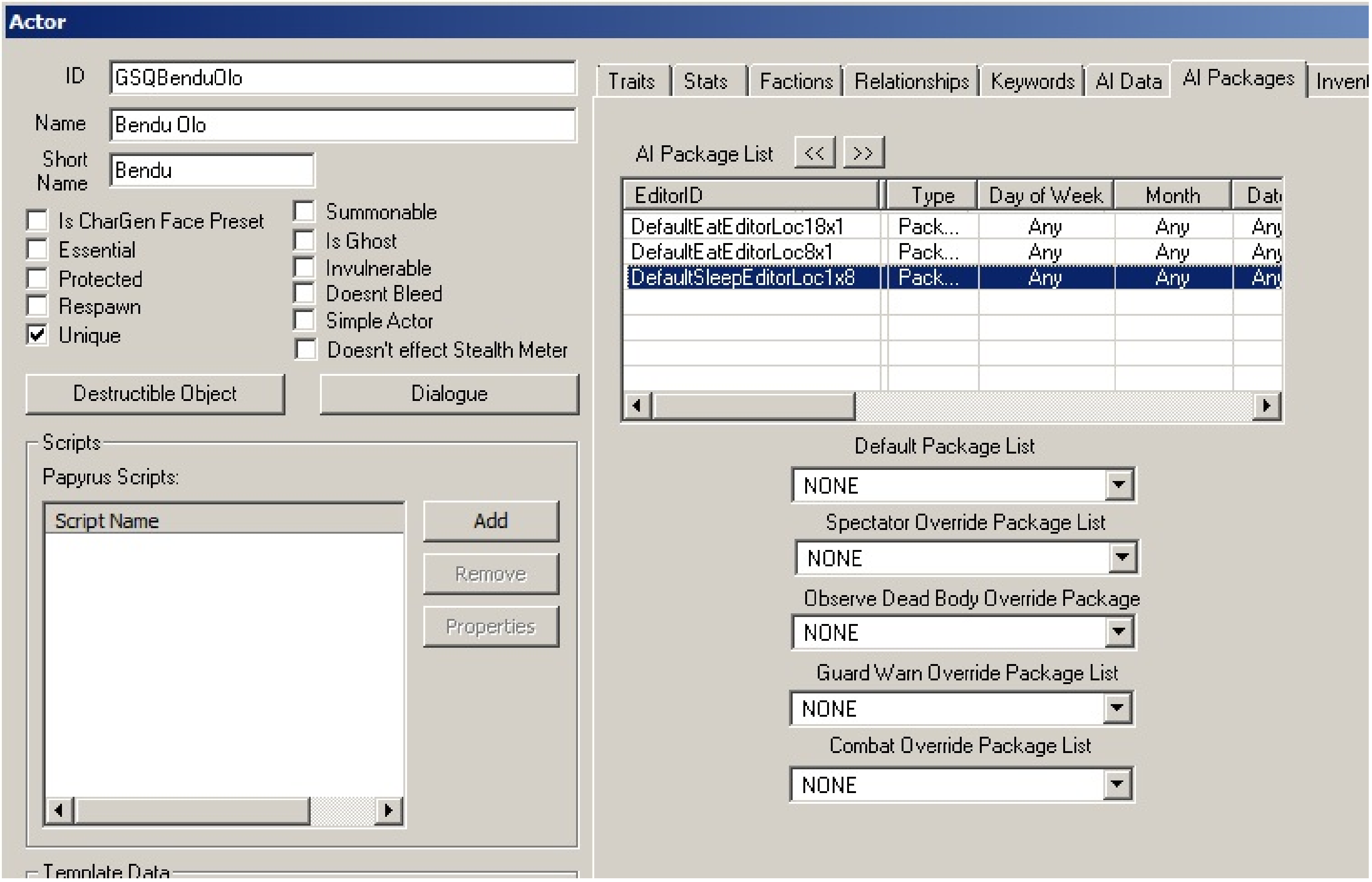
Observe Dead Body Override Package: NONE

Guard Warn Override Package List: NONE

Combat Override Package List: NONE

Since the highest valid package "wins", at 8am Bendu will continue running his sleep package - the eat package lower in the stack will never be run, even though it is also valid at this time.

To make this work, all we have to do is make sure that the sleep package is below the breakfast package in Bendu's list, like this:



ID GSQBenduOlo

Name Bendu Olo

Short Name Bendu

☐ Is CharGen Face Preset
☐ Essential
☐ Protected
☐ Respawn
☑ Unique

☐ Summonable
☐ Is Ghost
☐ Invulnerable
☐ Doesnt Bleed
☐ Simple Actor
☐ Doesn't effect Stealth Meter

EditorID	Type	Day of Week	Month	Dat
DefaultEatEditorLoc18x1	Pack...	Any	Any	Any
DefaultEatEditorLoc8x1	Pack...	Any	Any	Any
DefaultSleepEditorLoc1x8	Pack...	Any	Any	Any

Default Package List
NONE

Spectator Override Package List
NONE

Observe Dead Body Override Package
NONE

Guard Warn Override Package List
NONE

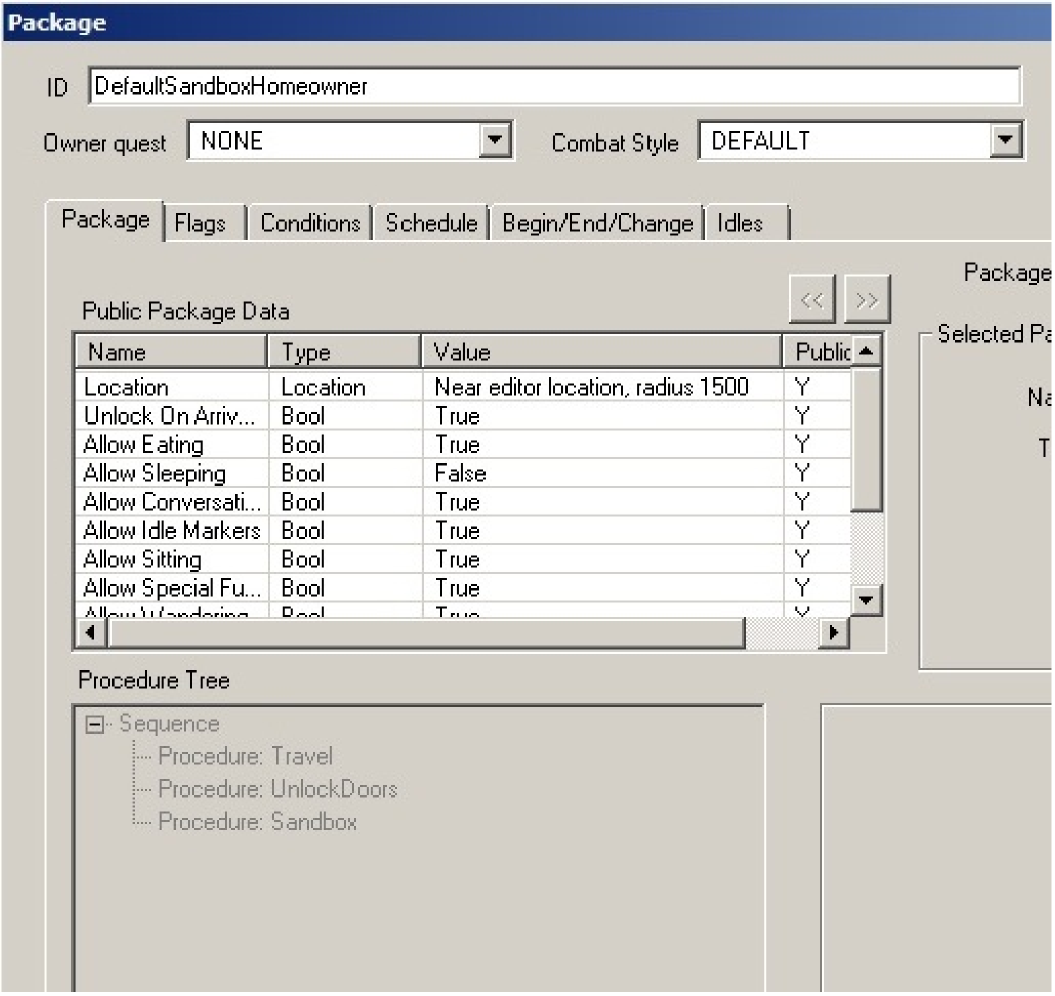
Combat Override Package List
NONE

Now, he will start his DefaultSleepEditorLoc1x8 at 1 am, as we intended - it's the only valid package at that time. When 8am rolls around, Bendu will switch to DefaultEatEditorLoc8x1, because it is now the highest valid package - so Bendu will only get 7 hours of sleep instead of the 8 specified by his sleep package, but he won't miss his breakfast.

We've now got a good chunk of Bendu's day covered - he eats for 2 hours a day, and sleeps for 7. We could continue to fill in his day with scheduled packages, but it's almost always a good idea to give him a "fallback" package to run when nothing else is valid. This package should have no conditions, and no schedule so it is always valid - and because of that, it should sit at the very bottom of his package list.

We often use a Sandbox package for just this purpose - it lets the NPC move around a space, picking semi-randomly what to do. Very useful when we don't particularly care what the NPC is doing but want him to continue to behave naturally.

For our purposes, **DefaultSandboxHomeowner** is a good choice. Let's open it up and take a look at its data:



ID: DefaultSandboxHomeowner

Owner quest: NONE

Combat Style: DEFAULT

Public Package Data

Name	Type	Value	Public
Location	Location	Near editor location, radius 1500	Y
Unlock On Arriv...	Bool	True	Y
Allow Eating	Bool	True	Y
Allow Sleeping	Bool	False	Y
Allow Conversati...	Bool	True	Y
Allow Idle Markers	Bool	True	Y
Allow Sitting	Bool	True	Y
Allow Special Fu...	Bool	True	Y
Allow Wandering	Bool	True	Y

Procedure Tree

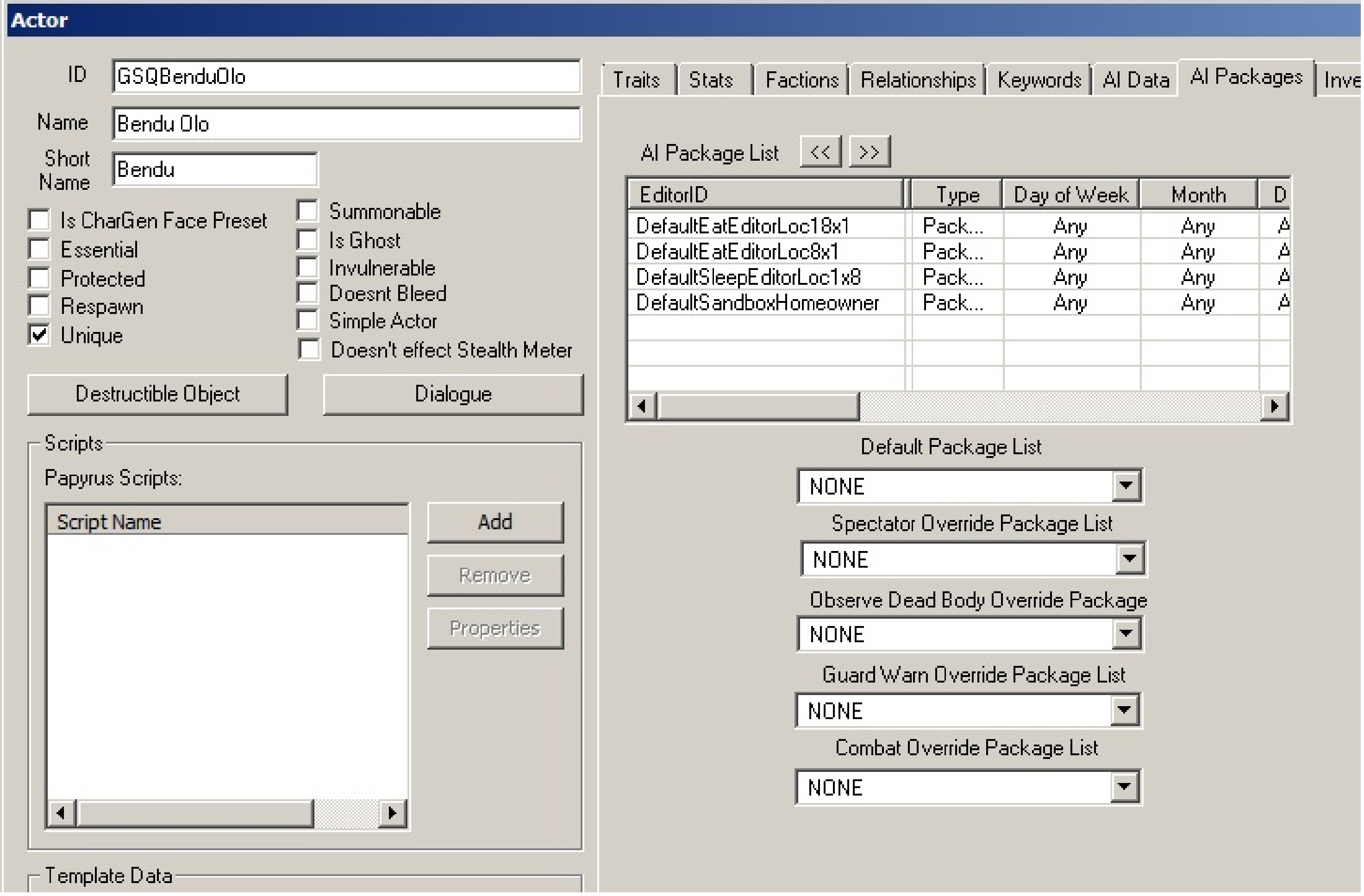
```
Sequence
    Procedure: Travel
    Procedure: UnlockDoors
    Procedure: Sandbox
```

Its "Location" field specifies "Near editor location, radius 1500" - this means that he will "sandbox" around the spot he is placed in the editor, with a radius of 1500 units (which is usually enough to cover a small interior building). If you look at the other default packages in Bendu's list, you'll notice they're all using "Near editor location" - because they don't specify an exact location in the world, they can be used by any actor.

Another useful feature of this package is "Unlock On Arrival = True". This means that whenever he starts running this package, he will unlock his doors, which is good since he's supposed to be a questgiver - we don't want him hiding behind a locked door.

You can flip to its Conditions and Schedule tabs to verify that it has no conditions, and no specified schedule, which means that it is always valid (which is what we wanted).

So, let's drop this into Bendu's list at the bottom. He now has a complete, simple schedule:



ID: GSQBenduOlo
Name: Bendu Olo
Short Name: Bendu

☐ Is CharGen Face Preset
☐ Essential
☐ Protected
☐ Respawn
☑ Unique
☐ Summonable
☐ Is Ghost
☐ Invulnerable
☐ Doesnt Bleed
☐ Simple Actor
☐ Doesn't effect Stealth Meter

AI Package List

EditorID	Type	Day of Week	Month	D
DefaultEatEditorLoc18x1	Pack...	Any	Any	A
DefaultEatEditorLoc8x1	Pack...	Any	Any	A
DefaultSleepEditorLoc1x8	Pack...	Any	Any	A
DefaultSandboxHomeowner	Pack...	Any	Any	A

Script Name

Default Package List: NONE
Spectator Override Package List: NONE
Observe Dead Body Override Package: NONE
Guard Warn Override Package List: NONE
Combat Override Package List: NONE

If you want to see him in action, load up the game and move yourself to him:

```
coc MixwaterMillWorkersHouse
```

To see his behavior at different times, you can change the time in the game as follows:

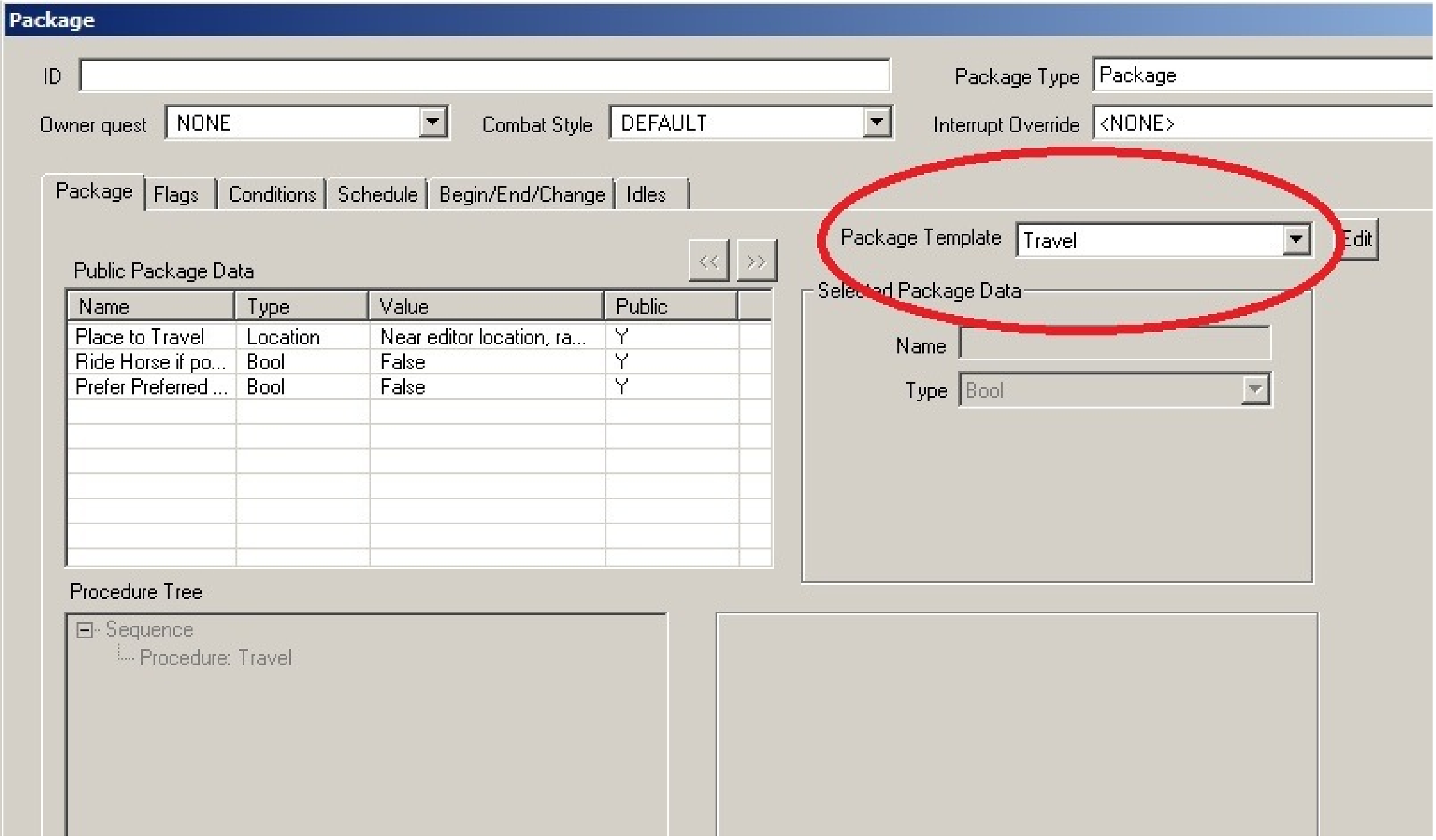
```
set gamehour to 2
```

He now has some simple eat/sleep/wander behaviors inside "his" house. If he does not want to sleep and asks you to leave, you can use the command *toggledetection* so he ignores you.

Making a New Package

We've seen how to use existing "default" packages to build a schedule. What about making a new package specifically for Bendu? Let's say we want him to patrol the exterior around his house at a specific time during the day.

First, make a new package by right-clicking on the Package list and selecting "New". You'll get a blank package window that looks like this:



Package

ID

Package Type: Package

Owner quest: NONE

Combat Style: DEFAULT

Interrupt Override: <NONE>

Package Template: Travel

Public Package Data

Name	Type	Value	Public
Place to Travel	Location	Near editor location, ra...	Y
Ride Horse if po...	Bool	False	Y
Prefer Preferred ...	Bool	False	Y

Selected Package Data

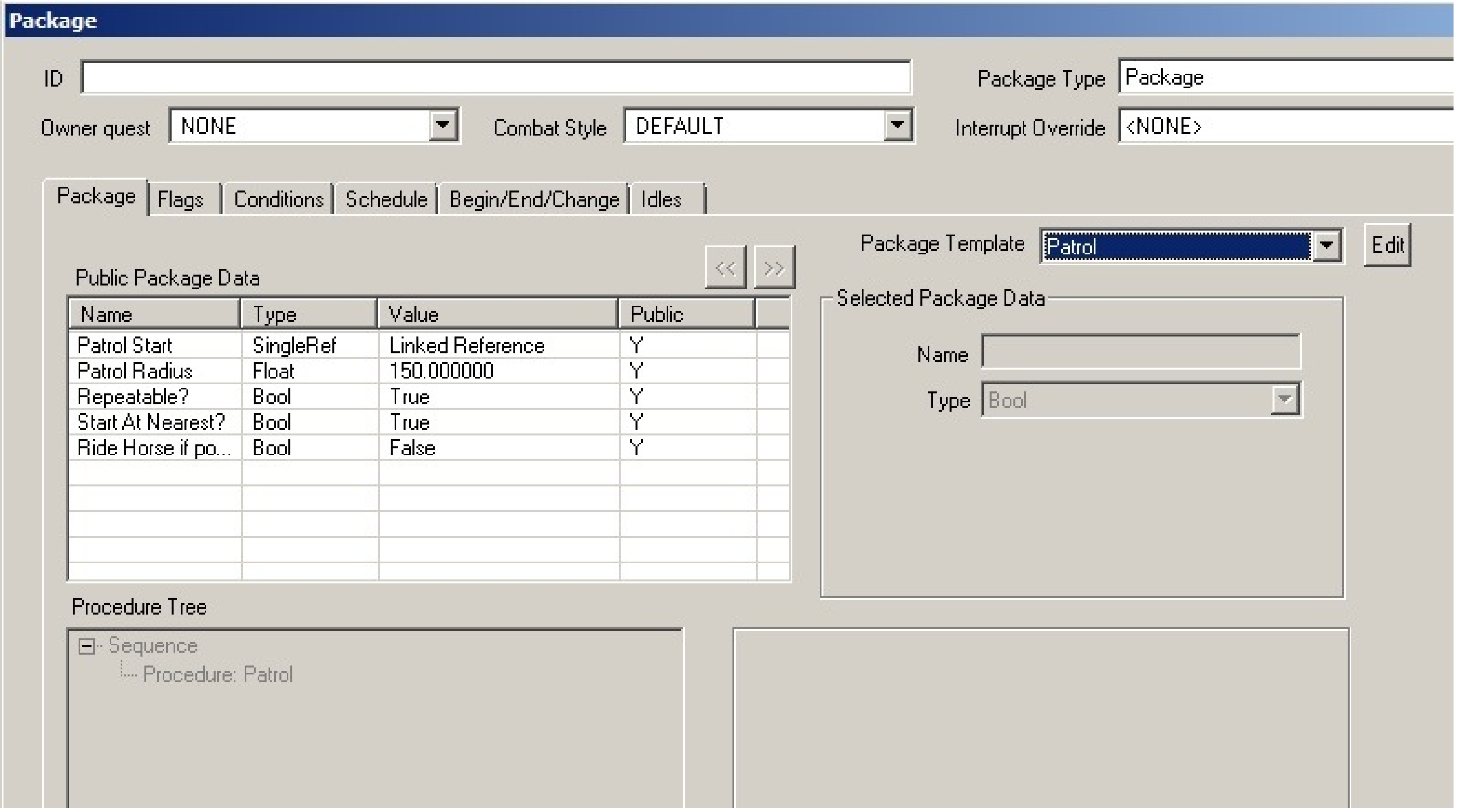
Name

Type: Bool

Procedure Tree

```
⊟ Sequence
   └ Procedure: Travel
```

By default, the Travel template is selected - but we want to make a Patrol, so change the dropdown to Patrol. Note that the list of Package Data changes - the Patrol template requires different data than the Travel template. Now we have a blank Patrol package, ready to fill in some data for the specific package for Bendu:



Package

ID

Package Type: Package

Owner quest: NONE

Combat Style: DEFAULT

Interrupt Override: <NONE>

Package Template: Patrol

Public Package Data

Name	Type	Value	Public
Patrol Start	SingleRef	Linked Reference	Y
Patrol Radius	Float	150.000000	Y
Repeatable?	Bool	True	Y
Start At Nearest?	Bool	True	Y
Ride Horse if po...	Bool	False	Y

Selected Package Data

Name

Type: Bool

Procedure Tree

```
⊟ Sequence
   └ Procedure: Patrol
```

The Patrol procedure page has the details for the data on this package. For now, the only things we need to specify on this package are:

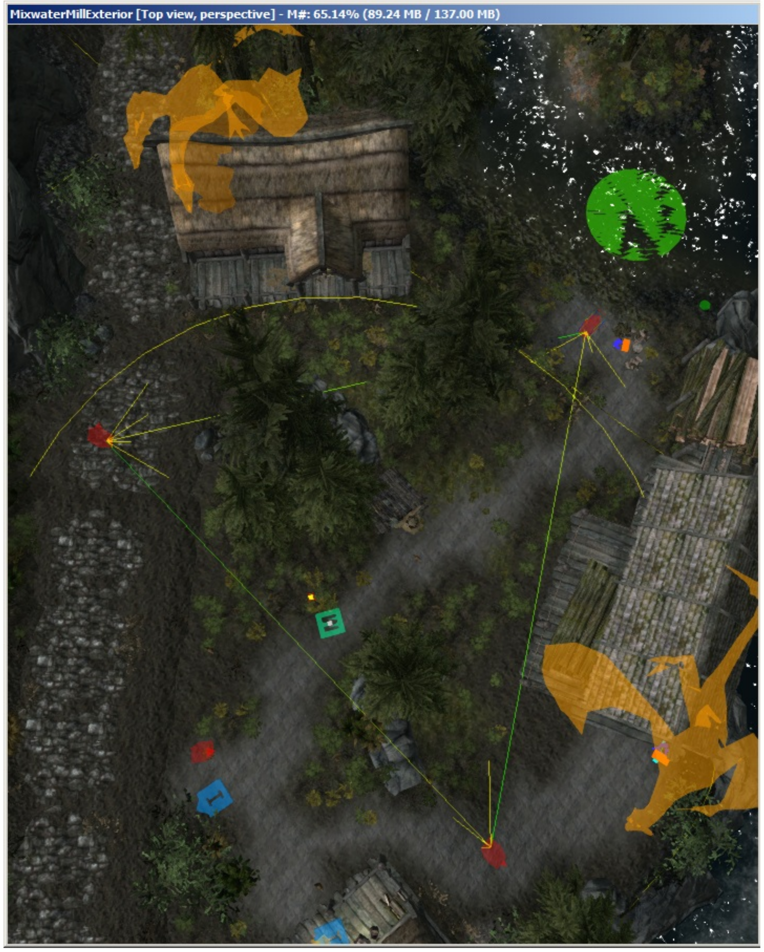
- Patrol Start - where should Bendu start his patrol route?
- Schedule - what time of day should he run this package?

We haven't yet made a patrol route for Bendu, so let's load up the exterior and set up a simple one for him. (If you have the interior loaded, double-clicking on the yellow door marker is a quick way to get to the exterior; otherwise double-click on MixwaterMillExterior in the cell list for the Tamriel worldspace.)

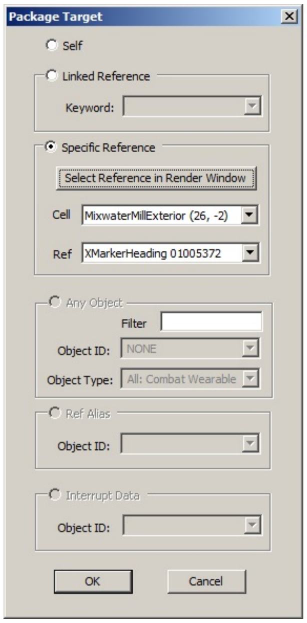
If you're not familiar with linked references, the Encounters Tutorial is a good place to start. For now, let's just create a quick 3-point patrol route:

1. Drop an XMarkerHeading into the render window.
2. Duplicate it twice with CTRL-D.
3. Move the 3 markers into a nice patrol route, then link them together using the Linked Ref tab on each reference.

You should end up with something looking like this (the exact locations of the patrol markers doesn't matter):


MixwaterMillExterior [Top view, perspective] - M#: 65.14% (89.24 MB / 137.00 MB)

Now, in the package window, select Patrol Start and click the button on the right (it will initially say "Linked Ref". This will allow you to select the data for the Patrol Start - select the "Specific Reference" radio button and select one of your new patrol points (it doesn't matter which since they are all linked together in a circle).



Package Target

○ Self

○ Linked Reference

Keyword:

● Specific Reference

Cell: MixwaterMillExterior (26, -2)

Ref: XMarkerHeading 01005372

○ Any Object

Filter:

Object ID: NONE

Object Type: All: Combat Wearable

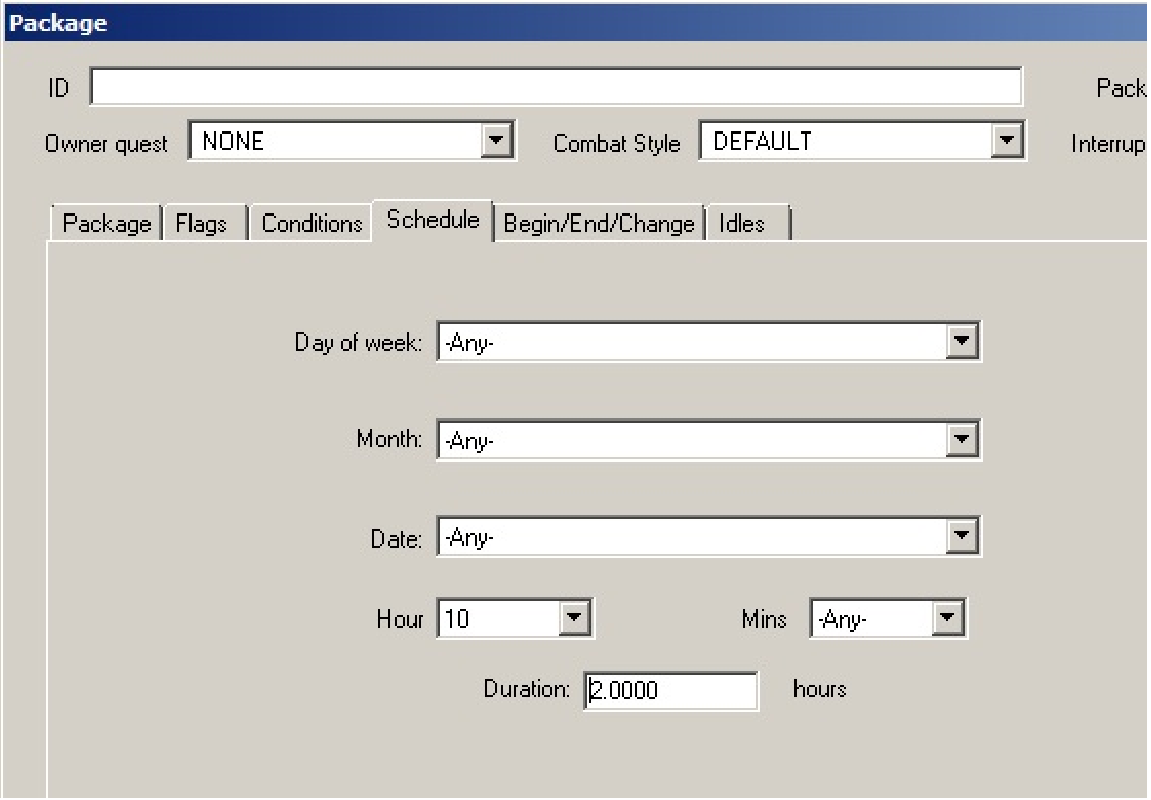
○ Ref Alias

Object ID:

○ Interrupt Data

Object ID:

The second thing we wanted to do was specify when Bendu should run this package (otherwise this will be the only thing he does when we put it on his package stack). Switch to the Schedule tab in the package window, and let's say he should walk around outside during the morning between 10am and 12pm:



Package

ID:

Owner quest: NONE

Combat Style: DEFAULT

Day of week: -Any-

Month: -Any-

Date: -Any-

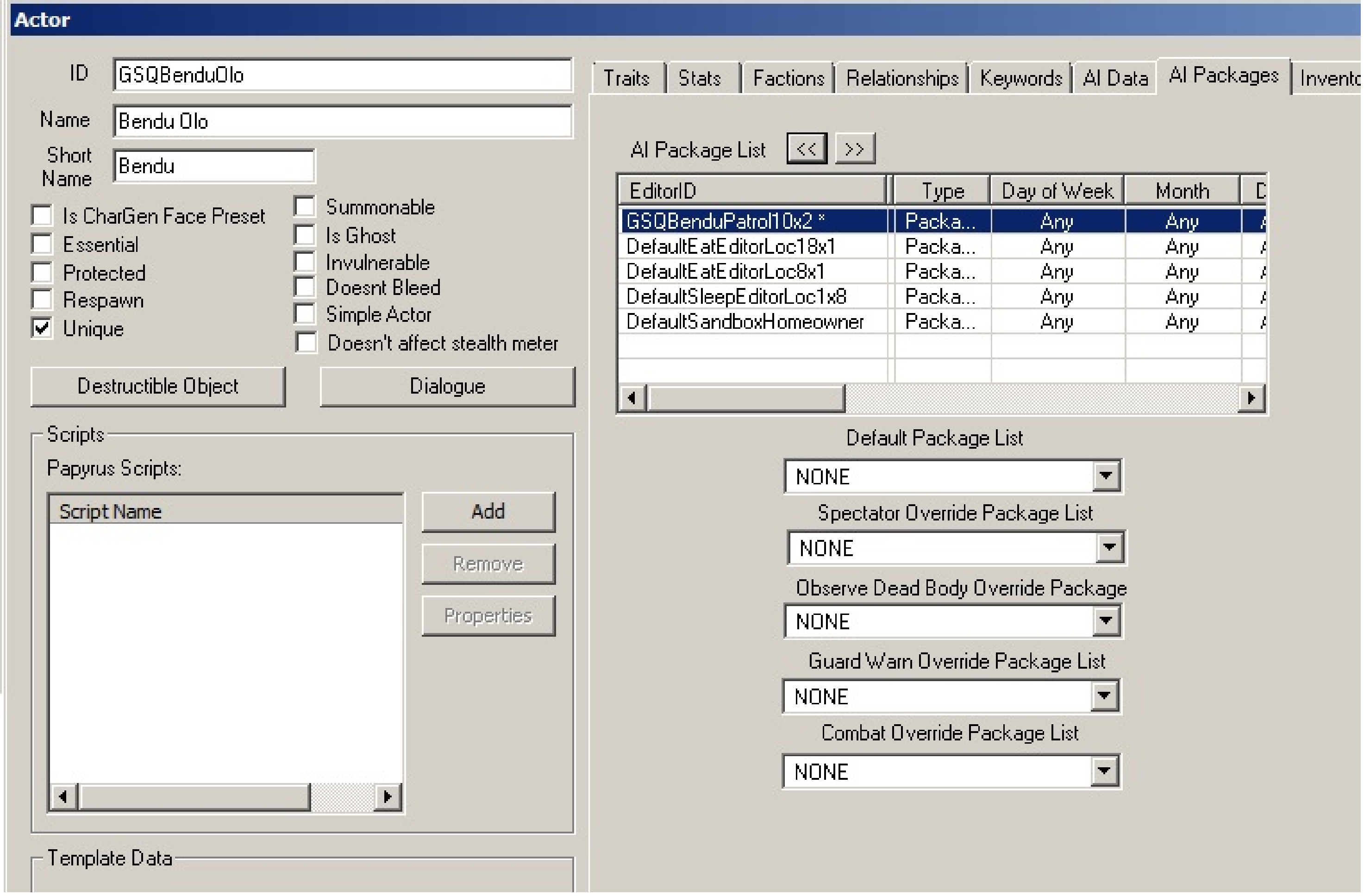
Hour: 10

Mins: -Any-

Duration: 2.0000 hours

The only thing left to do is give the package a name - let's say GSQBenduPatrol10x2, keeping with the standard naming conventions. Hit OK to close the window and we're done making a new package.

Now that we've made the new package, we have to add it to Bendu's package list in order to actually change his behavior. Find the new package in the Package section of the Object window, and drag it into Bendu's AI Package List. By default, all new packages are placed at the bottom of the actor's package list, but we want this new package to go to the top (or at least above the DefaultSandboxHomeowner package - otherwise it will never run because the DefaultSandboxHomeowner package is always valid). Use the << arrow key to move it to the top of Bendu's stack:



ID: GSQBenduOlo

Name: Bendu Olo

Short Name: Bendu

□ Is CharGen Face Preset
□ Essential
□ Protected
□ Respawn
☑ Unique

□ Summonable
□ Is Ghost
□ Invulnerable
□ Doesnt Bleed
□ Simple Actor
□ Doesn't affect stealth meter

Scripts

Papyrus Scripts:

Script Name

AI Package List

EditorID	Type	Day of Week	Month	D
GSQBenduPatrol10x2 *	Packa...	Any	Any	A
DefaultEatEditorLoc18x1	Packa...	Any	Any	A
DefaultEatEditorLoc8x1	Packa...	Any	Any	A
DefaultSleepEditorLoc1x8	Packa...	Any	Any	A
DefaultSandboxHomeowner	Packa...	Any	Any	A

Default Package List: NONE

Spectator Override Package List: NONE

Observe Dead Body Override Package: NONE

Guard Warn Override Package List: NONE

Combat Override Package List: NONE

Hit OK to close Bendu's actor window and save your plugin. Go into the game to see Bendu do his new patrol:

```
coc MixwaterMillExterior
set gamehour to 10
```

That's it - you now know how to set up an actor's packages using existing or new packages. Most of the time, the premade Package Templates will provide all the functionality you need. But, if you find you need even more specialized behavior, you can even build your own Package Template.