BUILD THE HTML PAGE

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<!DOCTYPEHTMLPUBLIC"//W3C//DTDHTML4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">

<html>

<head>

<metahttp-equiv="Content-

Type"content="text/html;charset=UTF-8">

<title>Artificialintelligence:OpenKore sourcecodedocumentation</title>

<linkrel="stylesheet" type="text/css"href="openkore.css">

<!--FixbrokenPNGtransparencyforIE/Win5-6+-

->

<!--[ifgteIE5.5000]>

<script type="text/javascript"src="pngfix.js"></scri pt>

<![endif]-->

<styletype="text/css">

<!--

.example{margin:

0.3cm;marginleft:0.5cm;

}

.comment{font-

style:italic;

}

.term{border-bottom:1px dottedblack;

}

.cstr{color:

#007700;

}

-->

</style>

</head>

<body>

<divid="title">OpenKoresourcecodedocumentation</div>

<divid="navigation">

<ul>

<li><ahref="http://openkore.sourceforge.net/">Mainwe bsite</a></li>

<li><ahref="index.html">Table ofcontents</a></li>

<li><b>Artificialintelligence</b></li>

</ul>

</div>

<divid="main">

<h1>HowtheAIsubsystemisdesigned</h1>

TheAIsubsystemisn'treallycomplex,butitcouldtakeawhileto understandit'sdesign.

<p>

All"intelligence"ishandledinsidethe

<code>AI()</code>function(rightnowit'sone bigfunctionbutwehopetosplititinthefuture).

Asexplainedinthe<a>Mainloop&amp;initialization</a>page, the<code>AI()</code>functiononlyrunsless thanafractionofasecond.

<p>

Basically,theAItellsKoretodocertainthingsbasedonthecurrent situation.I'lltrytoexplainitwithsomeexamples.

<aname="ex1"></a>

<h2>Example1:Randomwalk</h2>

You'reprobablyfamiliarwithKore'srandomwalkfeature.

IftherearenomonstersandKoreisn'tdoinganything,itwillwalk toarandomspotonthemap,andattack anymonstersitencounters.

Thefollowingpieceofcode(withinthe

<code>AI()</code>functionmakesKorewalktoarandomspotif itisn'tdoinganything:

<preclass="example">

1. <spanclass="comment">#####RANDOM

WALK#####</span>

1. <b>if</b>($config{'route\_randomWalk'}&&

$ai\_seq[0]

<b>eq</b>""&&@{$field{'field'}}>1&& !$cities\_lut{$field{'name'}.'.rsw'}){

1. <spanclass="comment">#Finda

randomblockonthemapthatwecan walkon</span>

1. <b>do</b>{
2. $ai\_v{'temp'}{'randX'}=int(rand()

\*($field{'width'}-1));

1. $ai\_v{'temp'}{'randY'}=int(rand()

\*($field{'height'}-1));

1. }

<b>while</b>($field{'field'}[$ai\_v{'temp'}{'randY'}\*$field{'width'}+

$ai\_v{'temp'}{'randX'}]);8

1. <spanclass="comment">#Moveto

thatblock</span>

1. message<span

class="cstr">"Calculatingrandomrouteto:

$maps\_lut{$field{'name'}.'.rsw'}($field{'name'}):

$ai\_v{'temp'}{'randX'},$ai\_v{'temp'}{'randY'}\n"</span>,

<spanclass="cstr">"route"</span>;

1. ai\_route(\%{$ai\_v{'temp'}{'returnHash'}},
2. $ai\_v{'temp'}{'randX'}, 13 $ai\_v{'temp'}{'randY'},
3. $field{'name'},
4. 0,
5. $config{'route\_randomWalk\_maxRouteTime'},
6. 2,
7. undef,
8. undef,
9. 1);
10. }

</pre>

Wecallthisblockofcodean<emclass="term">AI codeblock</em>.

Inotherwords,anAIcodeblockis<em>anentire blockofcodewhichdealswithacertainpartoftheAI</em>.

<h3>Situation check</h3>Inline1,it checks:

<ol>

<li>whethertheconfigurationoption

<code>route\_randomWalk</code>ison</li> <li>whethertherearecurrentlynootheractive

<emclass="term">AIsequences</em>(seebelow)</li>

<li>whetherwe'recurrentlyNOTinacity</li>

</ol>

Ifalloftheaboveistrue,thenKorewillrunthecodeinside thebrackets.

<p>

Whatisan<emclass="term">AIsequence</em>?Itis avaluewithinthe<code>@ai\_seq</code>array.

Thisarrayisa<em>commandqueue</em>.

<p>

AIcodeblocksprependvaluesintothisarraysothey canknowwhenit'stheirturntodosomething.

WhenanAIcodeblockisdonewithit'stask,itwillremove thatvaluefromthearray.

So,if<code>@ai\_seq</code>isempty,thenthatmeansallAI codeblockshavefinishedandKoreisn'tdoinganythingelse.

AndthisiswhentherandomwalkAIcodeblockjumpsin.

<p>

Thereisalsothe<code>@ai\_seq\_args</code>array,usedto storetemporaryvariablesusedbythecurrentAIcodeblock.

Ifavalueisprependedinto<code>@ai\_seq</code>,thenavalue mustalsobeprependedinto <code>@ai\_seq\_args</code>.Mo reonthislater.

<h3>Findingarandompositiontowalkto</h3>

Line4-7triestofindarandompositioninthemap thatyoucanwalkon. (<code>$field{field}</code> is a reference to an arraywhichcontainsinformationaboutwhichblocksyoucanandcan't walkon.

Butthat'snotimportantinthisexample.Youjust havetounderstandwhatthisblockdoes.)

<p>

Theresultcoordinateisputintothesetwovariables:

<ul>

<li><code>$ai\_v{temp}{randX}</code></li>

<li><code>$ai\_v{temp}{randY}</code></li>

</ul>

<small>(Incaseyoudidn'tknow,

<code>$foo{bar}</code>isthesameas<code>$foo{'bar'}</code

>.)</small>

<h3>Moving</h3>

Line11-20isthecodewhichtellsKoretomovetotherandom position.

Ittells<code>ai\_route()</code>whereitwantstogoto.

<code>ai\_route()</code>prependsa<code>"route"</code>AI sequencein<code>@ai\_seq</code>,andargumentsinahash

(which is then prepended into

<code>@ai\_seq\_args</code>andimmediatelyreturns.

Shortlyafterthis,theentire<code>AI()</code>functionreturns.

Thepointis,<code>ai\_route()</code>is <em>notsynchronous</em>.

<p>

Inlessthanafractionofasecond,the <code>AI()</code>functioniscalledagain.

Becausethe<code>@ai\_seq</code>variableisnot emptyanymore,therandomwalkAIcodeblockisneveractivated (theexpression<code>'$ai\_seq[0]eq""'</code>isfalse).

<p>

TheAIcodeblockthathandlesroutingiselsewhere inthe<code>AI()</code>function.

Itseesthatthefirstvaluein<code>@ai\_seq</code>is

<code>"route"</code>,andthinks<em>"hey,nowit'smyturntodo something!"</em>.

(TherouteAIcodeblockisverycomplexsoI'mnotgoingtoexplain whatitdoes,butyougettheidea.)

WhentherouteAIcodeblockhasfinished,itwillremovethefirst itemfrom<code>@ai\_seq</code>.

If<code>@ai\_seq</code>isempty,thentherandom routeAIcodeblockisactivatedagain.

<h2>Example2:Attackingmonsterswhilewalkingto arandomspot</h2>

YoumightwanttowonderhowKoreisabletodeterminewhethertoattack monsterswhenit'swalking.

Let'stakealookatasmallpieceofit'ssourcecode:

<preclass="example">

<spanclass="comment">#####AUTO-ATTACK#####</span>

<b>if</b>(($ai\_seq[0]<b>eq</b>

<spanclass="cstr">""</span>||$ai\_seq[0]<b>eq</b>

<spanclass="cstr">"route"</span>||$ai\_seq[0]<b>eq</b>

<spanclass="cstr">"route\_getRoute"</span>||$ai\_seq[0]

<b>eq</b><spanclass="cstr">"route\_getMapRoute"</span> ||$ai\_seq[0]<b>eq</b> <spanclass="cstr">"follow"</spa n>

|| $ai\_seq[0] <b>eq</b> <spanclass="cstr">"sitAuto"</span>||$ai\_seq[0]<b>eq</b>

<spanclass="cstr">"take"</span>||$ai\_seq[0]<b>eq</b> <spanclass="cstr">"items\_gather"</span>||$ai\_seq[0] <b>eq</b><spanclass="cstr">"items\_take"</span>) ...

</pre> Asyoucanseehere,theauto-attackAIcodeblockisrunifanyof theaboveAIsequencesareactive.

SowhenKoreiswalking(<code>$ai\_seq\_args[0]</code> is"route"),Korecontinuestocheckformonsterstoattack.

<p>

Butasyoumayknow,ifyoumanuallytype"moveWhateEverMapNam e"intheconsole,Korewillmovetothatmapwithoutattacking monsters(yes,thisisintentionalbehavior).Whyisthat?

<p>

Asseeninexample1,the

<code>ai\_route()</code>functioninitializesthe routeAIsequence.

Thatfunctionacceptsaparametercalled"attackOnRoute". <code>$ai\_seq\_args[0]{attackOnRoute}</code>issetto thesamevalueasthisparameter.

Korewillonlyattackmonsterswhilemoving,if thatparameterissetto1.

Whenyoutype"move"intheconsole,thatparameterissetto 0.The randomwalkAIcodeblockhoweversetsthatparameterto1.

<p>

Insidetheauto-attackAIcodeblock,Korecheckswhetherthe argumenthashthat'sassociatedwiththe"route"AIsequencehasa

'attackOnRoute'key,andwhetherthevalueis1.

<preclass="example"> ...

$ai\_v{'temp'}{'ai\_route\_index'}=binFind(\@ai\_seq,

<spanclass="cstr">"route"</span>); <b>if</b>($ai\_v{'temp'}{'ai\_route\_index'}ne

<spanclass="cstr">""</span>){

$ai\_v{'temp'}{'ai\_route\_attackOnRoute'}= $ai\_seq\_args[$ai\_v{'temp'}{'ai\_route\_index'}]{'attackOnRoute'};

}

...

<spanclass="comment">#SomewhereelseintheautoattackAIcodeblock,Kore checkswhether

#$ai\_v{'temp'}{'ai\_route\_attackOnRoute'}isset to1.</span>

</pre>

<h2>Timeouts:Towaitawhilebeforedoingsomething</h2>

Incertaincasesyoumaywanttheprogramtowaitawhilebefore doinganythingelse.

Forexample,youmaywanttosenda"talktoNPC"packettotheserver,th ensenda"chooseNPCmenuitem2"packet 2secondslater.

<p>

Thefirstthingyouwouldthinkofisprobablytousethe <code>sleep()</code>function.

However,thatisabadidea.<code>sleep()</code>blocksthe entireprogram.Duringthesleep,nothingelsecanbeperformed.

Usercommandinputwillnotwork,otherAIsequences arenotrun,networkdataisnotreceived,etc.

<p>

Therightthingtodoistousethe

<ahref="Utils.html#timeOut"><code>timeOut()</code></a>function.

TheAPIdocumentationentryforthatfunctionhas twoexamples.Here'sanotherexample,demonstratinghow

you can use the timeOut() function in an AI sequence.ThisexampleinitializesaconversationwithNPC1337(aKa praNPC).

Thentwosecondslater,itsendsa"chooseNPCmenu item2"packet.

<preclass="example">

<spanclass="comment">#TheAI()functionisrunin themainloop</span>

<b>sub</b>AI{ ...

<b>if</b>($somethingHappened){

<b>my</b>%args;

$args{stage}=<spanclass="cstr">'Just

started'</span>;

<b>unshift</b>@ai\_seq,

<spanclass="cstr">"NpcExample"</span>;

<b>unshift</b>@ai\_seq\_args,\%args;

$somethingHappened=0;

}

<b>if</b>($ai\_seq[0]<b>eq</b>

<spanclass="cstr">"NpcExample"</span>){

<b>if</b>($ai\_seq\_args[0]{stage}

<b>eq</b><spanclass="cstr">'Juststarted'</span>){

<spanclass="comment">#ThisAI

sequencejuststarted

#Initializeaconversationwith

NPC1337</span>

sendTalk($net,1337);

<spanclass="comment">#Store

thecurrenttimeinavariable</span>

$ai\_seq\_args[0]{waitTwoSecs}{time}=<b>time</b>;

<spanclass="comment">#We

wanttowaittwoseconds</span> $ai\_seq\_args[0]{waitTwoSecs}{timeout}=2;

$ai\_seq\_args[0]{stage}=

<spanclass="cstr">'Initializedconversation'</span>;

}<b>elsif</b>($ai\_seq\_args[0]{stage}

<b>eq</b> <span

class="cstr">'Initializedconversation'</span>

<spanclass="comment">#This 'if'statementisonlytrueiftwosecondshavepassed

#since

$ai\_seq\_args[0]{waitTwoSecs}{time}isset</span>

&&timeOut(

$ai\_seq\_args[0]{waitTwoSecs})

){

<spanclass="comment">#

Twosecondshavenowpassed</span>

sendTalkResponse($net,1337,2);

<spanclass="comment">#

We'redone;removethisAIsequence</span> <b>shift</b>@ai\_seq;

<b>shift</b>@ai\_seq\_args;

} }

...

}

</pre>

<h2>Conclusion&amp;summary</h2>

TheentireAIsubsystemiskepttogetherbythese twovariables:

<ul>

<li><code>@ai\_seq</code>:aqueuewhichcontains AIsequencenames.

Usually,AIcodeblocksarerunbasedonthevalueofthefirst iteminthequeue

(thoughthisdoesn'thavetobetrue;itdependsonhowtheAI codeblockisprogrammed).</li>

<li><code>@ai\_seq\_args</code>:containsarguments that'sassociatedwithcurrentAIsequence.</li>

</ul>

Thedesignisprettysimple.Thisallowsthesystemto beveryflexible:

youcandoprettymuchanythingyouwant.There aren'tmanyreallimitations (butthat'sjustmyopinion).

<p>

The<code>AI()</code>functionrunsonlyveryshortly.SoAIcode blocksshouldn'tdoanythingthatcanblock thefunctionforalongtime.

<h3>Glossary</h3>

<ul>

<li>An<emclass="term">AIcodeblock</em>isanentireblock ofcodewhichdealswithacertainpartoftheAI.</li>

<li>An <em class="term">AI sequence</em> is a valuewithinthe<code>@ai\_seq</code>queue(andanassociatedv alueinsidethe<code>@ai\_seq\_args</code>array).</li>

</ul>

<p><hr><p>

<divid="footer">

<ul>

<li><ahref="http://validator.w3.org/check?uri=referer" title="ValidHTML

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<li><ahref="http://www.mozilla.org/products/firefox/"title

="GetFirefox-TakeBacktheWeb"><img width="104"height="32"src="http://www.mozilla.org/products/firef

ox/buttons/getfirefox\_small.png"alt="GetFirefox-TakeBack theWeb"></a></li>

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</ul>

</div>

</div>

</body>

</html>