

“Boolean Logic : Nethack”

Teacher notes

Overview:

After introducing boolean logic, this sheet can be used in a classroom discussion to give the students practice reading and understanding boolean expressions.

Background: About Nethack

Nethack is a role-playing game where the player (represented by an '@') takes on the role of an adventurer and wanders a dungeon fighting monsters and gathering treasure.

It was originally released in 1987 and the game uses standard ASCII characters for all of the objects in the game:

@	The player (you)
f	Your cat (feline)
>	Stairs leading down
<	Stairs leading up
-	Dungeon wall
.	Floor
#	Dungeon corridor
+	Door (closed)
%	Something you can eat (e.g., corpse)
^	Trap
{	Fountain

The use of standard symbols in Nethack has allowed the game to be ported to a large number of computer systems.

The Nethack game is freely available and it is open-source so you can see the logic used in the game. See <http://www.nethack.org/> for more info and downloads.

How to use this sheet:

There are two sections to the logic on the worksheet. The first part covers how the player can be petrified by a living cockatrice and the second part covers how a cockatrice corpse can cause petrification.

For each expression, encourage students to convert the formal boolean logic into a normal English sentence. Note that each row is connected by an OR, so you can analyze each row independently.

Part 1 - "How to be petrified by a cockatrice"

(HandAttack AND (NOT Gloves))

If you attack without a weapon, then you'd better be wearing gloves.

This can be stated as : "You will be petrified if you use a hand attack and you're not wearing gloves."

(Kick AND (NOT Boots))

If you attack by kicking, then you need to be wearing boots.

"You will be petrified if you use a kick attack and you're not wearing boots."

(Headbutt AND (NOT Helmet))

Normally, players cannot headbutt their opponent, but certain monsters (like a minotaur or unicorn) can attack this way. If the player polymorphs into one of these monsters, then a helmet is highly recommended when attacking a cockatrice.

"You will be petrified if you use a headbutt attack and you're not wearing a helmet."

(Hug AND (NOT (Gloves AND Cloak)))

If you're polymorphed into a monster with a hug attack and you try to use it against a cockatrice, you need to be wearing a cloak and gloves.

"You will be petrified if you use a hug attack and you're not wearing both gloves and a cloak."

(Bite OR Sting OR SuckBrain OR Swallow)

These are all special attacks that involve touching the opponent. If you've polymorphed into a monster with one of these attacks, using them in battle will result in petrification.

"You will be petrified if you use a bite attack."

"You will be petrified if you use a sting attack."

"You will be petrified if you use your tentacles for a brain sucking attack."

"You will be petrified if you swallow your opponent."

Part 2 - "How to be petrified by a cockatrice corpse"

Eat

In Nethack, after you defeat a monster, the corpse often remains as something that you

can eat. This is an integral part of the game and eating the corpse of some monsters can bestow magical abilities to the player (e.g., eating a floating-eye corpse will make you telepathic). However, eating a cockatrice corpse is a bad idea.

“You will be petrified if you eat a cockatrice corpse.”

HitBy

Because whatever it touches will turn to stone, a cockatrice corpse can make a great weapon. Sadly, some monsters in the game are aware of this as well and will use it against you.

“You will be petrified if you are hit by a monster wielding a cockatrice corpse.”

((NOT Gloves) AND (PickUp OR Wield OR Throw))

Since the corpse makes such a great weapon, you'll probably want to try it yourself - but only if you're wearing gloves.

“You will be petrified if you are not wearing gloves and you try to pick up, wield or throw a cockatrice corpse.”

(Gloves AND Wield AND (Fall OR DestroyGloves OR (Burdened AND Stairs)))

If you're wielding a cockatrice as a weapon, you'd better not fall or have anything bad happen to your gloves. You will fall if you walk into a trap or if you attempt to go down stairs while carrying too much. Your gloves can be destroyed if an opponent casts a DestroyArmor spell on you or if you try to enchant the gloves beyond what they can handle.

“You will be petrified if you are wearing gloves and wielding a cockatrice corpse and you either fall into a trap, or have your gloves destroyed or fall down the stairs from carrying too much.”

(Kick AND (NOT Boots))

“You will be petrified if you kick a cockatrice corpse and you're not wearing boots.”

(Blind AND (NOT Gloves) AND MoveInto AND (NOT Levitating))

If you've been blinded, then you need to use your hands to feel around to see where you're going. If “where you're going” happens to be into a space with a cockatrice corpse, then you've just touched it - I hope you have gloves. Of course, if you're levitating, then you pass right over the corpse.

“You will be petrified if you are blind and you're not wearing gloves and you move into a cockatrice corpse, unless you're levitating.”

Note that this is a simplified description of how the game handles player interactions with the cockatrice. For more information on the cockatrice in Nethack, see the source code or visit the wiki at <http://nethackwiki.com/wiki/Cockatrice>.

Credits:

Documents created by Gary Kacmarcik, using information from the Nethack source code and David Corbett's (now defunct) “Cockatrice Spoiler” page.