00:00:00,580 --> 00:00:28,870

[Muziki]

00:00:28,870 --> 00:00:31,519

habari na karibu kwa mada hii

00:00:31,519 --> 00:00:32,640

juu ya John Conway

00:00:32,640 --> 00:00:35,910

Mchezo wa Maisha

00:00:35,910 --> 00:00:35,920

Mchezo wa maisha ni

00:00:35,920 --> 00:00:37,750

Mchezo wa maisha ni otomatiki ya rununu

00:00:37,750 --> 00:00:37,760

otomatiki ya seli

00:00:37,760 --> 00:00:41,590

ilivumbuliwa na mwanahisabati wa Cambridge

00:00:41,590 --> 00:00:41,600

John Conway

00:00:41,600 --> 00:00:45,510

Mchezo huu una mkusanyiko wa

seli

00:00:45,510 --> 00:00:45,520

seli

00:00:45,520 --> 00:00:48,320

kwa kuzingatia sheria chache za hisabati

00:00:48,320 --> 00:00:51,430

Seli zinaweza kuishi,

00:00:51,430 --> 00:00:55,189

seli zinaweza kufa,

00:00:55,189 --> 00:00:58,709

au kuzidisha

00:00:58,709 --> 00:00:59,760

Kulingana na hali ya awali,

00:00:59,760 --> 00:01:03,270

seli huunda mifumo mbalimbali

00:01:03,270 --> 00:01:05,109

katika kipindi chote cha mchezo.

00:01:05,109 --> 00:01:06,479

Sasa hebu tuangalie sheria za mchezo.

00:01:06,479 --> 00:01:09,750

Mchezo huu una sheria 4 ambazo

00:01:09,750 --> 00:01:12,789

kuamua ikiwa seli inaishi,

00:01:12,789 --> 00:01:12,799

au kufa.

00:01:12,799 --> 00:01:15,190

Yote inategemea

00:01:15,190 --> 00:01:16,320

juu ya ni majirani wangapi wa seli hiyo wako hai

00:01:16,320 --> 00:01:19,670

Kanuni ya kwanza;

00:01:19,670 --> 00:01:19,680

Juu ya kuzaliwa

00:01:19,680 --> 00:01:23,040

Sasa, siku ya **kuzaliwa kwa seli**,

00:01:23,040 --> 00:01:26,479

**Kila seli iliyokufa karibu na majirani watatu hai**

00:01:26,479 --> 00:01:30,230

**itakuwa live katika kizazi kijacho**

00:01:30,230 --> 00:01:30,240

*kwa mfano*

00:01:30,240 --> 00:01:32,560

Wacha tutumie gridi hapa,

00:01:32,560 --> 00:01:33,360

Kwa kutumia njano post yake

00:01:33,360 --> 00:01:36,390

kuwakilisha seli hai,

00:01:36,390 --> 00:01:36,400

hakuna post yake

00:01:36,400 --> 00:01:38,870

kuwakilisha seli iliyokufa,

00:01:38,870 --> 00:01:39,759

na chapisho la bluu

00:01:39,759 --> 00:01:42,640

kupigia mstari kiini kilichozaliwa

00:01:42,640 --> 00:01:44,000

ambayo basi inakuwa tu

00:01:44,000 --> 00:01:47,280

seli ya kawaida katika njano

00:01:47,280 --> 00:01:48,310

*kwa mfano*

00:01:48,310 --> 00:01:48,320

ikiwa tuna seli

00:01:48,320 --> 00:01:52,310

Katika usanidi huu

00:01:52,310 --> 00:01:52,320

**Kanuni inasema hivyo**

00:01:52,320 --> 00:01:55,600

**Kila seli iliyokufa karibu na majirani watatu hai**

00:01:55,600 --> 00:01:58,079

**itakuwa live katika kizazi kijacho.**

00:01:58,079 --> 00:02:00,799

Sasa katika kesi hii majirani wanamaanisha

00:02:00,799 --> 00:02:03,990

kushoto kulia,

00:02:03,990 --> 00:02:04,000

juu, hadi chini

00:02:04,000 --> 00:02:07,429

na diagonal.

00:02:07,429 --> 00:02:08,000

Katika usanidi huu sisi tu

00:02:08,000 --> 00:02:11,280

kuwa na jirani mmoja aliyekufa yaani

00:02:11,280 --> 00:02:13,599

karibu na majirani watatu hai

00:02:13,599 --> 00:02:15,840

na hiyo hapa

00:02:15,840 --> 00:02:18,560

kwa hivyo tuna mtoto mmoja aliyezaliwa

00:02:18,560 --> 00:02:19,589

ambayo baadaye inakuwa hai

00:02:19,589 --> 00:02:19,599

katika kizazi kijacho.

00:02:19,599 --> 00:02:23,110

Sheria inayofuata

00:02:23,110 --> 00:02:23,120

**kifo kwa kutengwa**

00:02:23,120 --> 00:02:25,910

*inasema kwamba*

00:02:25,910 --> 00:02:28,879

**Kila seli hai iliyo na jirani mmoja au wachache hai itakufa katika kizazi kijacho.**

00:02:28,879 --> 00:02:32,470

Sasa, hebu tuangalie kiini jirani

00:02:32,470 --> 00:02:35,920

seli moja hai

00:02:35,920 --> 00:02:38,239

huku majirani waliobaki wakiwa wamekufa.

00:02:38,239 --> 00:02:41,350

Kutumia kanuni,

00:02:41,350 --> 00:02:41,360

seli hii,

00:02:41,360 --> 00:02:45,680

hufa kwa sababu imetengwa.

00:02:45,680 --> 00:02:47,350

kwa sababu kuna seli mbili tu zilizo hai

00:02:47,350 --> 00:02:47,360

Kwa sababu kuna seli mbili tu zilizo hai

00:02:47,360 --> 00:02:48,800

kwenye bodi na moja tu

00:02:48,800 --> 00:02:51,120

jirani kuishi,

00:02:51,120 --> 00:02:53,190

na hakuna seli zilizokufa

00:02:53,190 --> 00:02:53,200

ambayo yangeweza kuwa nayo

00:02:53,200 --> 00:02:55,270

majirani watatu hai,

00:02:55,270 --> 00:02:55,280

Hakutakuwa na kuzaliwa

00:02:55,280 --> 00:02:57,440

hata na seli moja kwenye ubao

00:02:57,440 --> 00:03:00,869

na majirani sifuri maisha.

00:03:00,869 --> 00:03:00,879

Kwa hivyo usanidi wote wa kuanzia

00:03:00,879 --> 00:03:02,400

na pekee

00:03:02,400 --> 00:03:05,910

seli moja

00:03:05,910 --> 00:03:05,920

mapenzi tu

00:03:05,920 --> 00:03:09,200

vyenye seli zilizokufa katika kizazi kijacho

00:03:09,200 --> 00:03:11,830

kwa sababu ya kutengwa.

00:03:11,830 --> 00:03:11,840

Hebu tuangalie

00:03:11,840 --> 00:03:13,910

kwa

00:03:13,910 --> 00:03:13,920

*kanuni ya tatu*

00:03:13,920 --> 00:03:15,990

**Kifo kwa Msongamano**

00:03:15,990 --> 00:03:16,000

Kanuni hii inasema,

00:03:16,000 --> 00:03:20,319

**Kila seli hai yenye majirani wanne au zaidi wanaoishi**

00:03:20,319 --> 00:03:23,750

itakufa katika kizazi kijacho kana kwamba kwa msongamano wa watu

00:03:23,750 --> 00:03:23,760

*kwa mfano:* ***hii***

00:03:23,760 --> 00:03:25,830

Kutumia kanuni,

00:03:25,830 --> 00:03:27,280

Seli mpya inazaliwa hapa kwa sababu

00:03:27,280 --> 00:03:29,920

ina majirani watatu haswa hai

00:03:29,920 --> 00:03:32,000

wakati seli hii inakufa kwa sababu ina nne

00:03:32,000 --> 00:03:34,789

majirani wanaoishi,

00:03:34,789 --> 00:03:34,799

sawa na seli hii hapa

00:03:34,799 --> 00:03:37,040

kwa sababu ina majirani wanne walio hai

00:03:37,040 --> 00:03:40,400

na seli mpya inazaliwa hapa kwa sababu ina tatu

00:03:40,400 --> 00:03:44,480

kuishi majirani.

00:03:44,480 --> 00:03:53,190

Kufuatia sheria, seli hii hufa kwa sababu ya kutengwa -

00:03:53,190 --> 00:03:56,319

ilikuwa na jirani mmoja tu aliye hai

00:03:56,319 --> 00:03:58,159

Sawa na seli hii hapa

00:03:58,159 --> 00:04:01,589

Katika kizazi kijacho chembe mpya huzaliwa hapa

00:04:01,589 --> 00:04:03,840

kwa sababu ina majirani watatu walio hai

00:04:03,840 --> 00:04:06,959

huku seli hii ikifa kwa sababu ya kutengwa

00:04:06,959 --> 00:04:09,439

Sawa na hii

00:04:09,439 --> 00:04:13,190

na usanidi wetu mpya ni huu

00:04:13,190 --> 00:04:13,200

Katika usanidi huu maalum

00:04:13,200 --> 00:04:14,789

kuendelea na kanuni,

00:04:14,789 --> 00:04:14,799

tukiendelea na kanuni tunafahamu hilo

00:04:14,799 --> 00:04:17,359

tunajua kwamba wote wanakufa katika kizazi kijacho

00:04:17,359 --> 00:04:20,239

**Mbona?**

00:04:20,239 --> 00:04:21,600

Kwa sababu katika kesi hii kila seli itakuwa tu

00:04:21,600 --> 00:04:24,390

kuwa na upeo wa jirani mmoja aliye hai

00:04:24,390 --> 00:04:29,189

hakutakuwa na kuzaliwa kwa kuwa kuna chembe hai chini ya tatu

00:04:29,189 --> 00:04:36,479

Kwa hivyo usanidi wote wa awali utakufa katika kizazi hiki cha mwisho.

00:04:36,479 --> 00:04:40,070

na

Hii hapa ni **kanuni ya nne**

00:04:40,070 --> 00:04:40,080

**Kuishi**

00:04:40,080 --> 00:04:43,919

Kanuni hii inasema,

00:04:43,919 --> 00:04:50,469

**kila seli hai iliyo na majirani wawili au watatu hai itasalia moja kwa moja kwa kizazi kijacho**

00:04:50,469 --> 00:04:51,350

*kwa mfano*

00:04:51,350 --> 00:04:51,360

usanidi huu

00:04:51,360 --> 00:04:54,720

Katika usanidi huu kila seli ina majirani watatu hai;

00:04:54,720 --> 00:05:00,870

Kiini cha kwanza hapa kina mbili, tatu na nne kama majirani

00:05:00,870 --> 00:05:04,390

Seli mbili hapa ina moja, tatu na nne kama majirani,

00:05:04,390 --> 00:05:04,400

sawa na

00:05:04,400 --> 00:05:07,600

Seli nne iliyo na seli tatu, moja na mbili na sawa kwa seli ya 3

00:05:07,600 --> 00:05:10,320

na muhimu zaidi

00:05:10,320 --> 00:05:12,950

Sheria hizi zote zinatumika

00:05:12,950 --> 00:05:13,990

kwa seli zote

00:05:13,990 --> 00:05:14,000

wakati huo huo

00:05:14,000 --> 00:05:16,870

Kwa hivyo tunayo;

00:05:16,870 --> 00:05:16,880

**Kuzaliwa kana kwamba kwa uzazi**,

00:05:16,880 --> 00:05:20,310

**Kifo kwa kutengwa kana kwamba ni kwa idadi ndogo ya watu**,

00:05:20,310 --> 00:05:22,880

**Kifo kwa msongamano wa watu kama vile watu wetu,**

00:05:22,880 --> 00:05:26,390

na

00:05:26,390 --> 00:05:26,400

**Kuishi**

00:05:26,400 --> 00:05:30,560

Sasa, hebu tuone ni nini sheria hizi rahisi zinaweza kufanya

00:05:30,560 --> 00:05:33,199

Kwa kuzingatia usanidi kama huu:

00:05:33,199 --> 00:05:37,189

Unafikiri nini kitatokea kwa seli hizi?

00:05:37,189 --> 00:05:39,199

Seli hizi zinaweza kuwa hai na tokeni ndani

00:05:39,199 --> 00:05:42,390

au amekufa bila ishara ndani.

00:05:42,390 --> 00:05:42,400

Katika matoleo ya kompyuta,

00:05:42,400 --> 00:05:49,749

seli hai zinawakilishwa na rangi moja na seli zilizokufa na nyingine au gridi tupu

00:05:49,749 --> 00:05:52,710

Kwa nadharia,

00:05:52,710 --> 00:05:57,120

saizi ya seli au gridi ya taifa haina kikomo lakini bodi ndogo zitafanya kwa uchezaji wa awali

00:05:57,120 --> 00:06:03,749

Huu ni mchezo wa pekee au ulio na mchezaji mmoja tu na uchezaji wa mchezo wa kawaida unaonekana hivi

00:06:03,749 --> 00:06:15,350

Unaweza kusitisha video na ujaribu usanidi huu peke yako

00:06:15,350 --> 00:06:15,360

[SItisha]

00:06:15,360 --> 00:06:18,400

Tutumie kanuni

00:06:18,400 --> 00:06:20,240

Mambo yanaanza kuvutia zaidi hapa

00:06:20,240 --> 00:06:25,430

Kuanzia na usanidi wa awali hapa basi

00:06:25,430 --> 00:06:25,440

Tunaendelea na kizazi kijacho

00:06:25,440 --> 00:06:27,120

na tunatumia kanuni

00:06:27,120 --> 00:06:41,919

Mipangilio mingi ya tatu ni tofauti vya kutosha kwamba hufa katika kizazi kimoja au viwili

00:06:41,919 --> 00:06:44,240

lakini hii ni ubaguzi

00:06:44,240 --> 00:06:49,110

Kuanzia na mstari wa seli tatu,

00:06:49,110 --> 00:06:52,309

seli mbili za mwisho zitakufa kwa sababu walikuwa na jirani mmoja kila moja

00:06:52,309 --> 00:06:57,120

Wakati kiini cha kati kitaishi kwa sababu kilikuwa na majirani wawili walio hai

00:06:57,120 --> 00:07:07,749

Kutakuwa na kuzaliwa mara mbili na usanidi mpya katika kizazi kijacho utakuwa huu

00:07:07,749 --> 00:07:15,270

Uzazi hutokea katika seli mbili karibu na seli iliyobaki ambayo ilikuwa imekufa kwa sababu

00:07:15,270 --> 00:07:21,029

kila nafasi hizo ziko karibu na nafasi tatu za kuanzia moja kwa moja

00:07:21,029 --> 00:07:23,280

Mchoro huu utajirudia katika kila kizazi cha pili

00:07:23,280 --> 00:07:31,039

Na seli mbili za mwisho zinakufa na seli mpya huzaliwa

00:07:31,039 --> 00:07:43,670

Kutoka kwa mstari wa usawa hadi mstari wa wima wa tatu

00:07:43,670 --> 00:07:46,150

Mchoro unaitwa **blinker**

00:07:46,150 --> 00:07:49,749

Wakati hii, kama tulivyokuwa tumeitazama kabla haijatulia

00:07:49,749 --> 00:07:58,080

Sitisha video na ujaribu mwenyewe

00:07:58,080 --> 00:08:01,589

Kutumia kanuni,

00:08:01,589 --> 00:08:06,070

Chembe hai mbili hapa hufa kwa sababu ya kutengwa

00:08:06,070 --> 00:08:09,270

Tutasalia na seli moja ya moja kwa moja katika kizazi kijacho

00:08:09,270 --> 00:08:16,000

00:08:09,270 --> 00:08:16,000

00:08:09,270 --> 00:08:16,000

00:08:09,270 --> 00:08:16,000

00:08:23,280 --> 00:08:26,550

pamoja na hili kwa sababu ya kutengwa

00:08:26,550 --> 00:08:31,840

Kutupa mpangilio huu katika kizazi kijacho ilhali hii pia haipunguzi chochote

00:08:31,840 --> 00:08:36,790

Seli zote hufa kwa sababu ya kutengwa

00:08:36,790 --> 00:08:44,949

Sasa, vipi kuhusu usanidi kama huu unaoitwa **glider**

00:08:44,949 --> 00:08:44,959

[SItisha]

00:08:44,959 --> 00:08:48,720

Sasa, acha video hapa na ujaribu kutumia sheria

00:08:48,720 --> 00:08:56,470

Unaweza pia kujaribu hatua za kwanza za kielelezo hapa ukisimamisha video

00:08:56,470 --> 00:08:56,480

[SItisha]

00:08:56,480 --> 00:09:08,230

Kwa kutumia sheria seli mpya huzaliwa hapa na pale huku seli hii ikifa kwa kutengwa na hii

00:09:08,230 --> 00:09:09,200

Kutoa hii kama kizazi kijacho

00:09:09,200 --> 00:09:22,000

Katika kizazi kinachofuata seli mpya huzaliwa hapa na hapa vizuri seli hii inakufa kwa sababu ya msongamano na hii inakufa kwa sababu ya kutengwa

00:09:22,000 --> 00:09:25,200

Resulting to this as the new configuration

00:09:25,200 --> 00:09:33,590

Katika kizazi kijacho chembe mpya huzaliwa hapa huku seli hii ikifa kwa sababu ya msongamano sawa na hii kwa sababu ya msongamano

00:09:33,590 --> 00:09:38,000

Samahani wa kwanza hapa anakufa kwa sababu ya kutengwa

00:09:38,000 --> 00:09:45,279

seli mpya huzaliwa hapa huku hii ikifa kwa sababu ya kutengwa

00:09:45,279 --> 00:09:48,959

na hii ndiyo matokeo ya usanidi wa kizazi kijacho

00:09:48,959 --> 00:09:52,080

Sasa, hebu tuangalie kisanduku hiki katika toleo la kompyuta

00:09:52,080 --> 00:10:08,470

andika katika [***https://www.silvergames.com/en/game-of-life***](https://www.silvergames.com/en/game-of-life) kwenye kompyuta yako

00:10:08,470 --> 00:10:09,269

kisha cheza skrini nzima

00:10:09,269 --> 00:10:13,760

Tumia kidhibiti kukimbia ili kuonyesha kilichopo kwenye skrini na uweke hatua ya kuonyesha hatua kwa hatua

00:10:13,760 --> 00:10:18,800

Unaweza pia kutumia wazi kufuta uliopita

00:10:18,800 --> 00:10:28,230

kuwakilisha athari ya seli zilizokufa

00:10:28,230 --> 00:10:45,360

Sasa hizi ni hatua za glider kutoka hii hadi hii kwa msingi huu hadi hii na muundo unaojirudia huku na huko

00:10:45,360 --> 00:10:51,120

Mchoro sawa unaojifungua sasa tunaweza kukimbia ili kuonyesha jinsi inavyoteleza kwenye skrini

00:10:51,120 --> 00:10:57,590

Sasa hivi ndivyo sheria hizi zinapendeza

00:10:57,590 --> 00:10:57,600

Angalia muundo

00:10:57,600 --> 00:11:00,240

Asante kwa kutazama

00:11:00,240 --> 00:11:06,720

Jaribu mwenyewe

Kuwa na furaha