```
import scipy.constants as _sc
import numpy as np

# solar mass, radius, luminosity
Msun = 1.98848e30 # kg
Rsun = 6.957e8 # m
Lsun = 3.828e26 # W

#print("The Mean Molecular Weight for\
# interstellar gas is {:.5}".format(mue_gas))

if __name__ == "__main__":
    constants = [
        ("solar mass",Msun,"kg"),
        ("solar radius",Rsun,"m"),
        ("solar luminosity",Lsun,"W"),
        ("gravitational constant",G,"m**3 s**-2 kg**-1"),
        ("Planck constant",h,"J s"),
        ("Planck constant, reduced",hbar,"J s"),
        ("electron mass",m_e,"kg"),
        ("proton mass",m_p,"kg"),
        ("neutron mass",m_n,"kg"),
        ("atomic mass unit",m_u,"kg"),
        ("speed of light",c,"m s**-1"),
        ("Boltzmann constant",k,"J K**-1"),
        ("parsec",pc,"m"),
        ("astronomical unit",au,"m"),
        ("year",year,"s"),
        ("Stefan-Boltzmann constant",sigmaSB,"W m**-2 K**-4")
    ]
```

SNAKESHIT

A Short Musical

Book, Music, and Lyrics by D. Q. Pham

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Cast of Characters

UNUK:	Woman (countryside or neither city-Asian nor city-White), mezzo-soprano, an astronomy student who neglects Python.
GUDJA:	Woman, soprano, an astronomy professor who brings Python into an everyday language.
MARFIK:	Man, tenor, a student who gets Python.
ALYA:	Woman, alto, a student who gets Python.
YED:	Man, bass, a student who gets Python.

Place

Classroom

Time

1990s or 2000s

Musical Numbers

main(**S**)	Unuk
repeat(**STRANGLE**)	Company
print(**SLITHER OFF**)	Unuk and Gudja

Setting: A classroom contains a desk.

At Rise: UNUK, carrying a stack of papers, enters.

(Song: “S”)

UNUK (breathlessly.)

UNUK. PLEASE TAKE A BREATH,
UNUK. SEMESTER’S DONE, UNUK.
ASTRONOMY, UNUK. WEED-OUT
COURSES OVER. DEEP RELEVANT
HOMEWORK.

(Placing the stack on the desk.)

THE SCOPE OF THE TELE.
BUTTERFLIES IN BELLY. FARM’S
BEEN STELLAR, UNUK.
CONSTELLATIONS APART. TIME
TO HOGTIE THE DARK.
SUPERNOVAE TO START.
LAGRANGIAN’S BEEN HARD.

(MARFIK, ALYA, and YED stroll in.)

COMMUNITIES OF STARS. SIGN
THAT ALL LEAVE A MARK.

(GUDJA, carrying a portable computer, marches in.)

A HOLY STAY, GUDJA.

(GUDJA examines the stack.)

THE BREAK’S BEGUN.

(GUDJA removes the stack. She places the computer on the desk.)

(They gather around the desk.)

(Song: “STRANGLE”)

GUDJA

ALL I ASK OF YOUR MENTAL
ENVI-MENT. SAVE IT. EXPORT
THEM. YA’LL WERE TAUGHT THIS
IN HIGH SCHOOL.

(UNUK alienates the computer.)

PRESENT, WELCOME BACK TO
THE FUTURE!

(Activating the computer.)

(The computer throttles.)

(UNUK chokes up.)

TIME’S JUST A SCALAR
QUANTITY THOUGH.

(Pointing to the computer.)

FILE… COMPUTE ORBITS AND
ENERGIES FOR THE SMALLEST
TIMESTEPS FOR EACH
INTEGRATION. YED. ALYA.
MARFIK. U. N N SERPENTIS HAS
AN ELIPSICAL PERIOD. IT IS ONLY
PYTHON.

(Moving aside.)

(MARFIK, ALYA, and YED take control of the computer.)

MARFIK	**ALYA**	**YED**
README M D.	RUN MATPLOTLIB.	OPEN NUMPY.
SOLAR	LIGHT SPEED	ATOMIC MASS
LUM-NOSITY.	INVERSE M S.	UNIT.

(UNUK discreetly takes a piece of paper from the hidden stack.)

ENERGY PLOT FUNCTIONS AND
THE OUTPUT.

(UNUK writes on the paper.)

(MARFIK, ALYA, and YED turn their attention to UNUK.)

WHITE.	COLD.	DWARF.

(Taking the paper from UNUK.)

COLD WHITE DWARF STAR.
CALC-LATE MASS RADIUS. FOR
US.

(Setting UNUK up to the computer.)

MAKE YOURSELF USEFUL.	TRY TO BE ON TOP.	DON’T GET LEFT BEHIND.

(UNUK holds her head.)

YES PRESSURE.	YES PRESSURE.	YES PRESSURE.

(Pointing to the computer.)

(UNUK glances at the paper.)

(MARFIK, ALYA, and YED rip up the paper and scour through other papers in the hidden stack.)

UNUK (disorientedly.)

STRANGLEHOLD. COULD NOT BE FELT WHILE WAND-RING A BARNYARD. FULLER OF THEM MICE.

(Toying with the mouse or touchpad.)

GUDJA

PYTHON IS ELEGANT SYNTAX, SCRIPTING.

UNUK

ITS TYPE'S TOO… DYNAMICALLY.

GUDJA

PERHAPS IT'S YOUR LIFE THAT NEEDS TO CHANGE THROUGH RESEARCH, LEARN TO CAST THE NET.

(Moving aside.)

UNUK

NOTHING GOOD COMES OUT OF WRANGLING PYTHON ON THE WEB.

(Typing then entering on the computer.)

WELCOME TO THE JAVA…

(Scrolling with conviction.)

(MARFIK, ALYA, and YED slithers back. They retake control of the computer.)

MARFIK	**ALYA**	**YED**
TOO MUCH PRESSURE.	TOO MUCH PRESSURE.	DENS-TY DEFINED.
‘QUATION OF STATE UNIT.	‘QUATION OF STATE TESTED.	‘QUATION OF STATE UNIT.
P-D RELATIONSHIP, BRANCH UNCOMMIT.		

(UNUK forces herself onto the computer. She hastily types.)

(MARFIK, ALYA, and YED force UNUK off the computer. They continue typing.)

STOP WITH ARTISTRY.	STOP THIS IMPRI-TY.	STOP FEELING FREELY.
SEE, NOTHING TOO COMPLEX.	SEE, DO NOT FEEL SO STRESSED.	SEE, JUST GIVE IT A REST.
PLUS, 3 D AIN’T WORTH IT.	PLUS, 3 D ARE FOR NERDS.	PLUS, 3 D LOADS TOO SLOW.
PLUS,	PLUS,	PLUS,

(Directing towards each wall except the fourth wall.)

BOXED IN.	BOXED IN.	BOXED IN.

(Boxing in UNUK into the computer.)

UNUK (reluctantly.)

FOREST WITH ALL INTRICATE
PARTS ARE MY MORAL CODE.
NATURE SNAKING AROUND WILL
NOT DO.

(UNUK types away.)

FLUSH. FOR CODES SO LUSH.
BYTE STREAM TO PUBLIC
SERVER.

(GUDJA takes control of the computer.)

GUDJA

PRIVATE. PRIVATE. PRIVATE.

(Returning the computer then scouring through papers in the hidden stack.)

MARFIK **ALYA** **YED**

STRANGLEHOLD. STRANGLEHOLD. STRANGLEHOLD.

(GUDJA returns the computer to UNUK.)

UNUK

JAVA. IT PROVIDES THE AIR TO BREATHE.

MARFIK **ALYA** **YED**

LANGUAGE NATIVE TO HER PEOPLE.

UNUK (sorely.)

OUGHT FOR ME TO INTEGRATE. SERVES YOU. LET ME JUST…

(Pressing CTRL and C.)

COPY.

(GUDJA, MARFIK, ALYA, and YED express shock.)

PASTE.

(Mashing CTRL and V.)

GUDJA

YOU HAVE JUST BROKEN THE CODE OF…

MARFIK **ALYA** **YED**

OFF… OF THE LAWS OF ENTROPY.

UNUK

THOUGH FRAMEWORK'S
DEBUGGED, JUST FIX CENTRAL
PRESSURE ARRAY FOR
MASS-RADIUS TABLE IN A
LIGHTWEIGHT CLASS.

GUDJA

CONDUCT. SEE ME AF…

MARFIK **ALYA** **YED**

THIS BOX HAS NO ROOM FOR A
PARTICULAR MOLECULE.

UNUK

PLOT ROOM FOR JAVA…
PROGRAMMERS.

MARFIK **ALYA** **YED**

VET-NAR-ANS. ENGINEERS. PERFORMERS.

(Pointing out.)

UNUK

I AM JUST AS MUCH OF AN
ASTRONOMER AS YOU ARE WITH
YOUR PRIVILEGED SELVES WITH
TECHNOL-GIES.

MARFIK **ALYA** **YED**

UNUK. FAILURE. UNUK. CODE BREAKER. UNUK. CHEATER.

UNUK

I AGREE TO OWN THIS FOR I HAVE ONLY CHEATED MYSELF. OH WELL.

(Looking to GUDJA for approval.)

THIS ASSIGNMENT, GIVE ME A ZERO.

MARFIK

NOT FOR US.

ALYA

NOT FOR US.

YED

NOT FOR US.

UNUK

PLEASE, YOU'RE AN INTEGRAL HERO.

GUDJA

'TERWARDS.

UNUK

SAKE OF GROUP, MY WILL SAYS I'LL JUST HAVE TO RETAKE WITH CLASS.

(GUDJA ponders at the hidden stack.)

COLLEGE WON'T JUST BE FOR THE RICH AS THIS STAR HOLDS THE MANTLE OF THE FIRST GENERATION.

(Feeling the weight of emotion.)

CHOKE.

(GUDJA dismisses MARFIK, ALYA, and YED.)

UNUK (Cont.)

I WILL NEVER DROP…

MARFIK **ALYA** **YED**

OUT. OUT. OUT.

(Exiting.)

(GUDJA deactivates the computer. She directs UNUK to her side. She grabs and sets down the stack.)

(Song: “SLITHER OFF”)

GUDJA

YOU DON’T BELONG ON THIS COURSE. YOUR WORK’S ALWAYS BEEN TOO COMPLEX.

(Pointing out the stack.)

I KNEW WELL BEFORE I TOOK YOU IN. JAVA’S A REL-TIVELY NEW LANGUAGE.

(Handing the computer to UNUK.)

GET AHEAD WHILE YOU CAN. DON’T GET CUT OFF. THERE ARE TELESCOPES IN THE DISTANCE. ‘STRON-MERS THAT CODE IN ALL TONGUE. EXECUTE THE SCRIPT.

(Waving UNUK off.)

(UNUK appears mystified.)

RUN THE PROGRAM NOW!

(Departing.)

(UNUK may hold the computer. She may run out in the open. She activates the computer. She knows there is a lot to unpack.)

UNUK

ROUND UP FOR AN ENTIRE UNIVERSE.

(Inhaling.)

AIR.

(Feeling lonely.)

‘ROR PROP-GATION.

(Collecting herself.)

DATA. READING. WRITING. MANIPULATING.

(Feeling powerful.)

SYSTEM EXIT. ZERO.

(Pressing.)

FADE OUT

FIN

Score

1S

Snakeshit

D. Q. PHAM

Andante

UNUK

U- nuk. Please take a breath, U - nuk. Se- mes- ter's done,

Piano

Drum Set

Guitar

F G F G F

7

UNUK

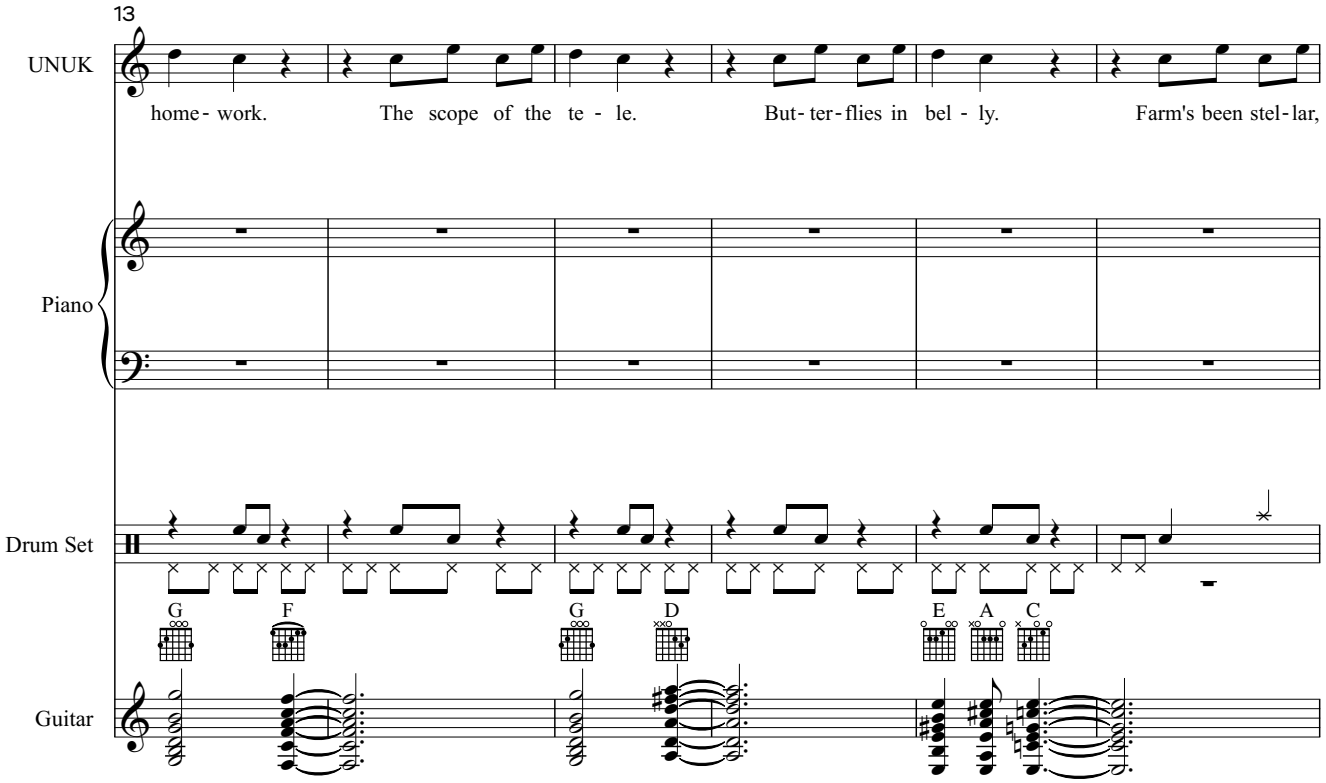
U - nuk. A- stro- no- my, U - nuk. Weed- out cour- ses o - ver. Deep re- le- vant

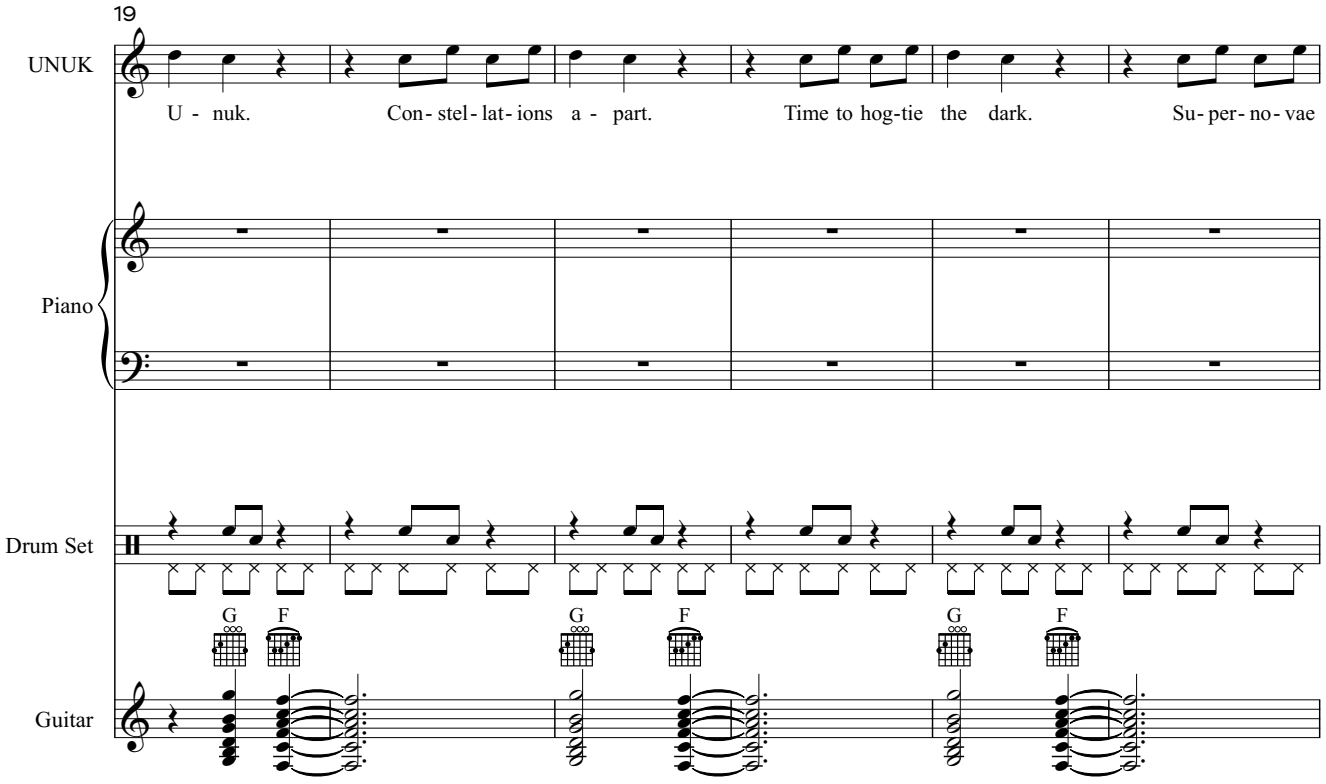
Piano

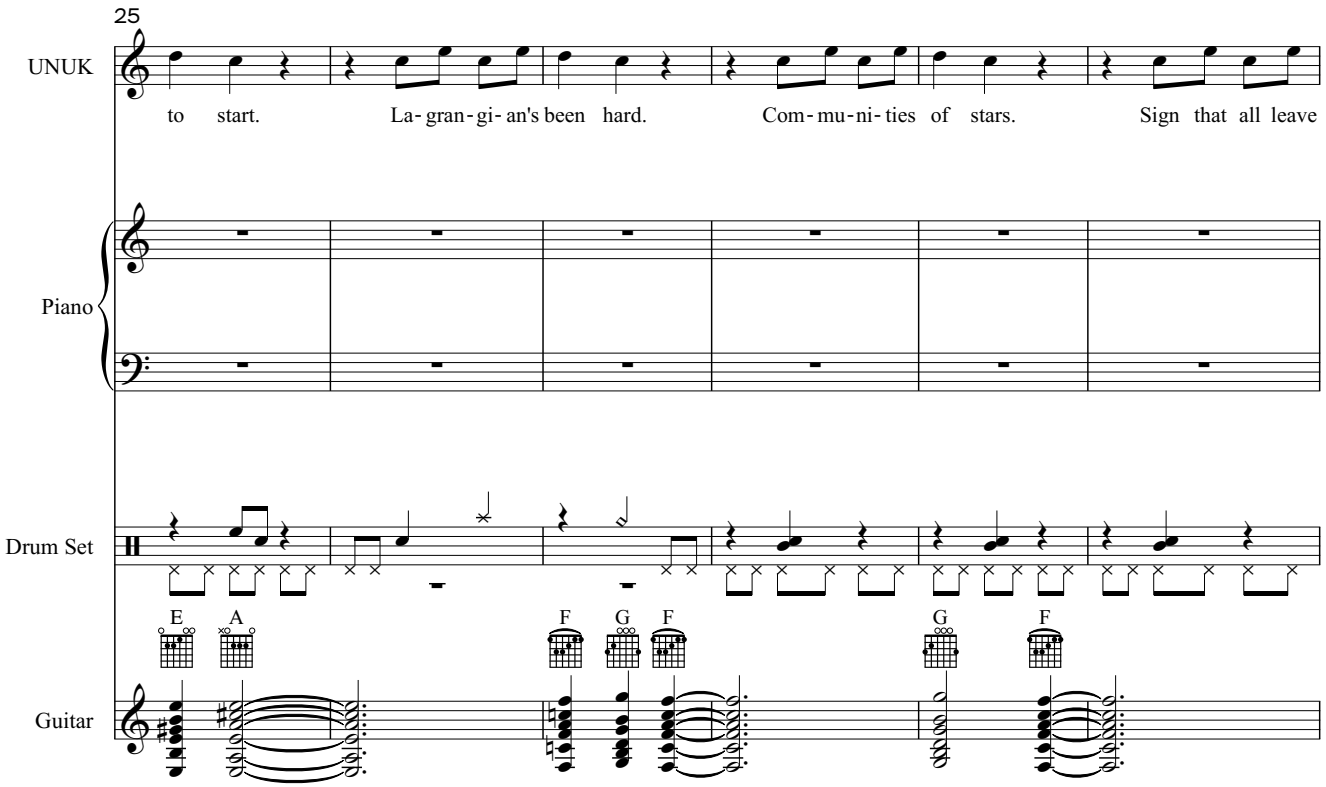
Drum Set

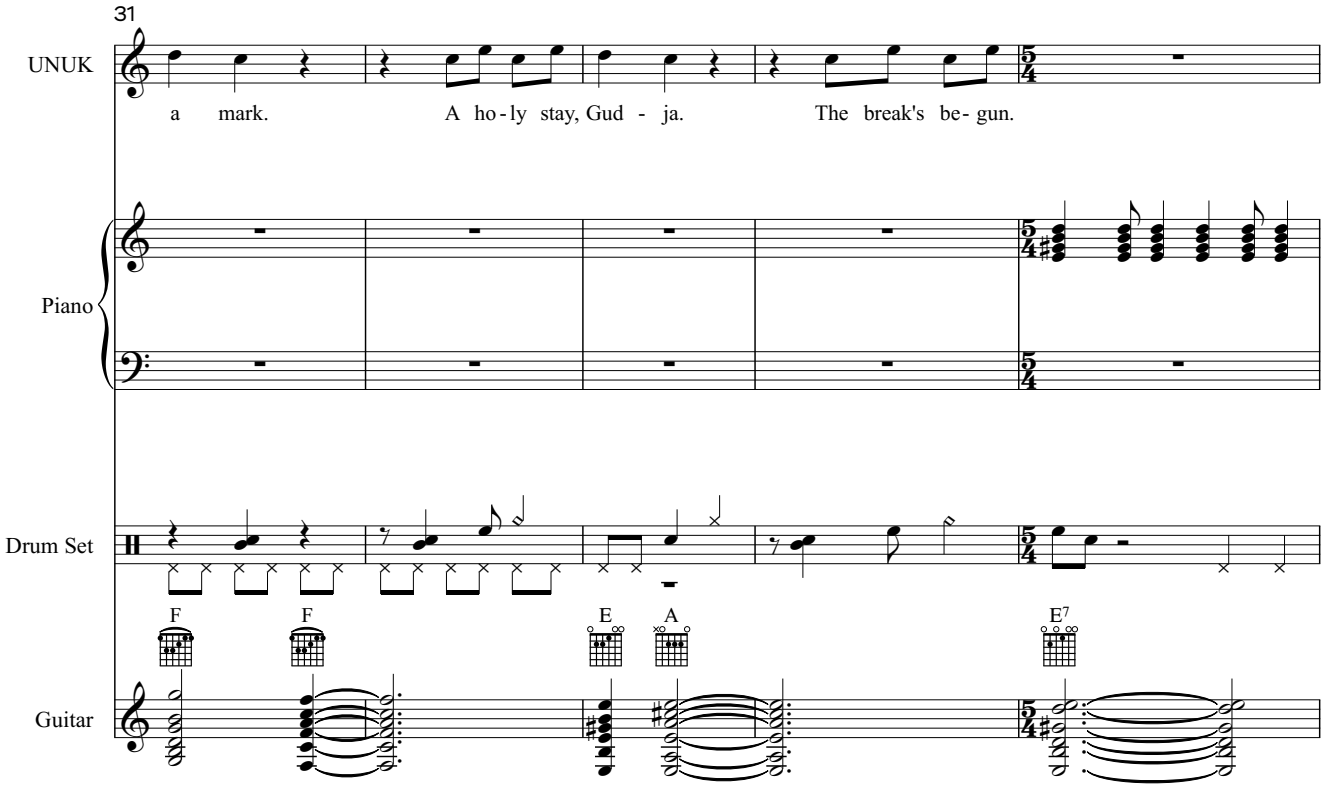
Guitar

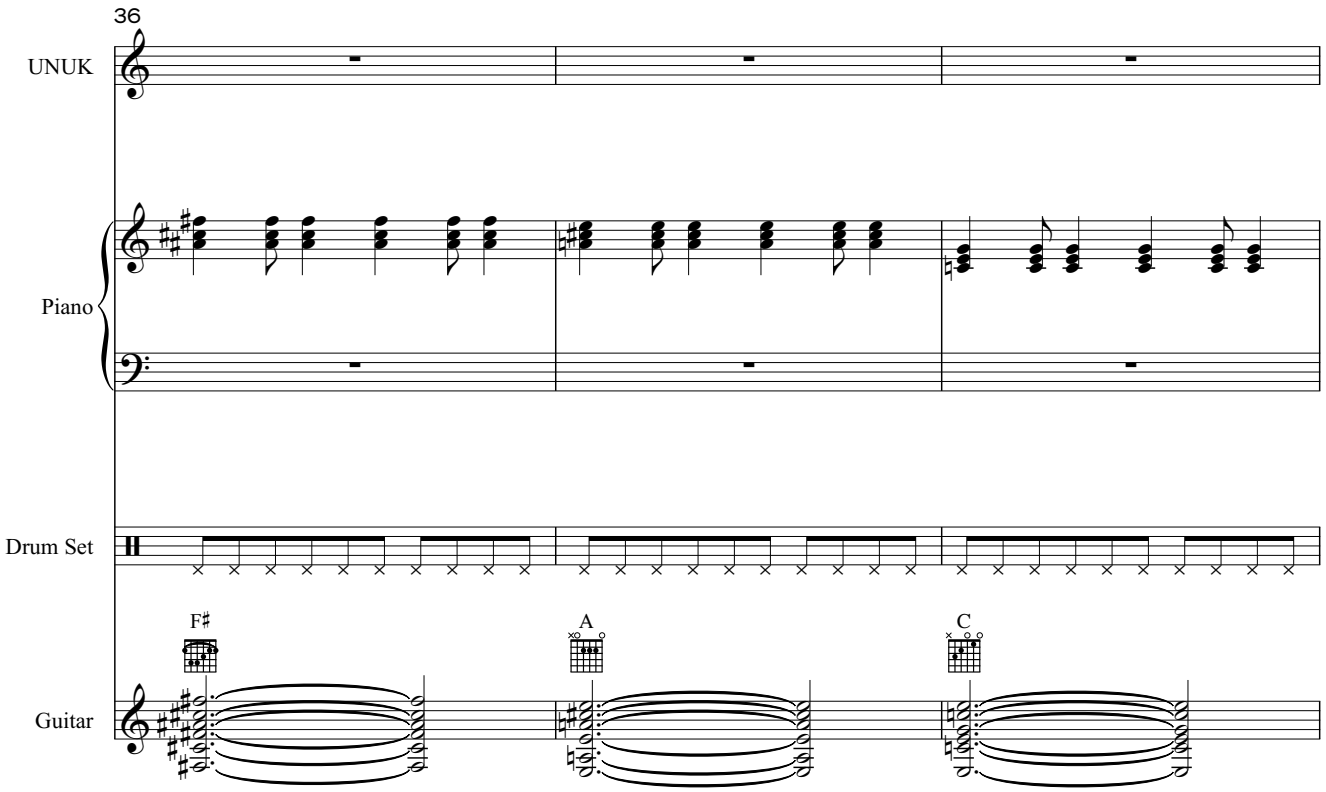
G D E A C F G F

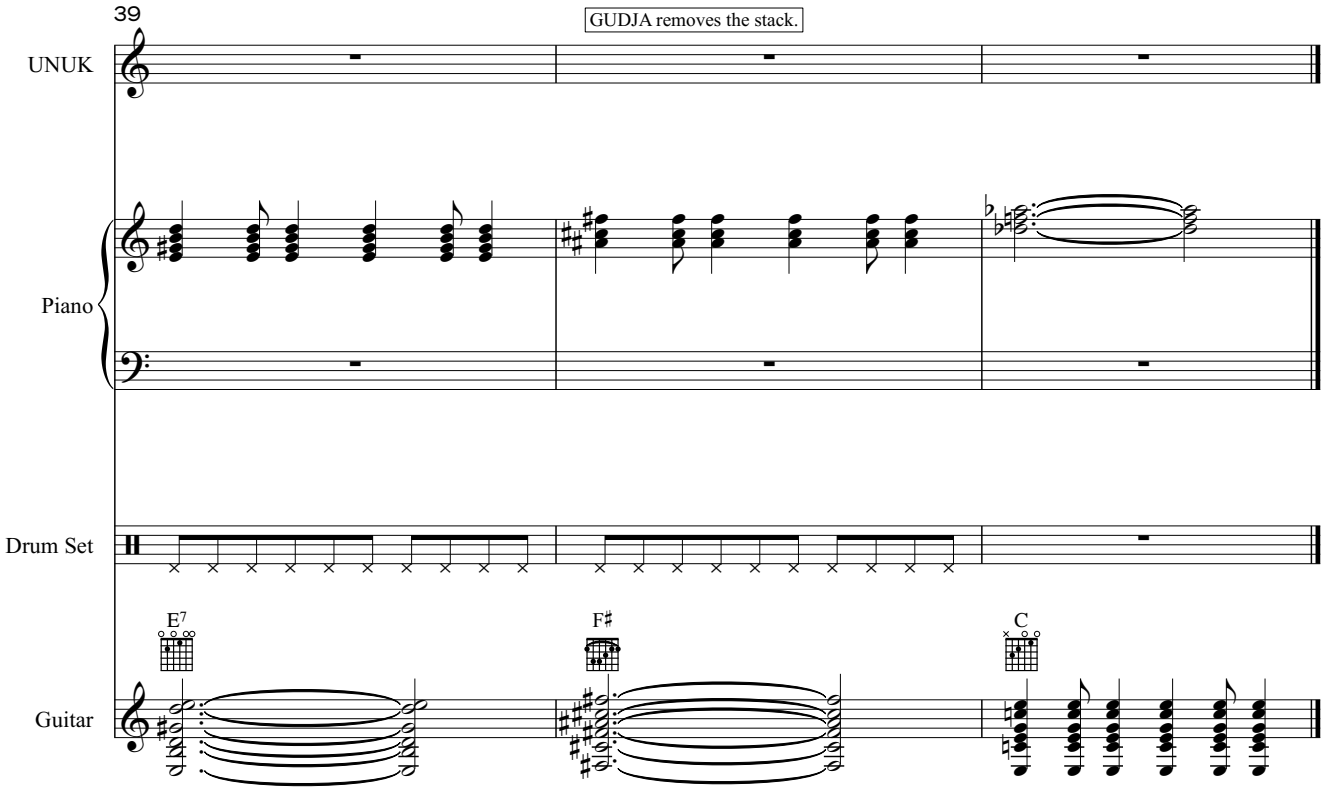

13
UNUK
home- work. The scope of the te - le. But- ter- flies in bel - ly. Farm's been stel- lar,
Piano
Drum Set
G F G D E A C
Guitar


19
UNUK
U - nuk. Con- stel- lat- ions a - part. Time to hog-tie the dark. Su- per- no- vae
Piano
Drum Set
G F G F G F
Guitar


25
UNUK
to start. La-gran-gi-an's been hard. Com-mu-ni-ties of stars. Sign that all leave
Piano
Drum Set
E A F G F G F
Guitar


31
UNUK
a mark. A ho-ly stay, Gud - ja. The break's be-gun.
Piano
Drum Set
F F E A E7
Guitar


36
UNUK
Piano
Drum Set
F♯
A
C
Guitar


39
GUDJA removes the stack.
UNUK
Piano
Drum Set
E7
F♯
C
Guitar

Score

2STRANGLE

Snakeshit

D. Q. PHAM

Andantino

UNUK

GUDJA

All I ask of your men-tal en-vi-ment. Save it. Ex-port them. Ya'll were taught this in high school. Pre-sent, wel-come

MARFIK

ALYA

YED

Piano

Drum Set

6

UNUK

GUDJA

back to the fu-ture! Time's just a sca-lar quan-ti-ty though. File...Com-pute or-bits and e-ner-gies for the small-est time

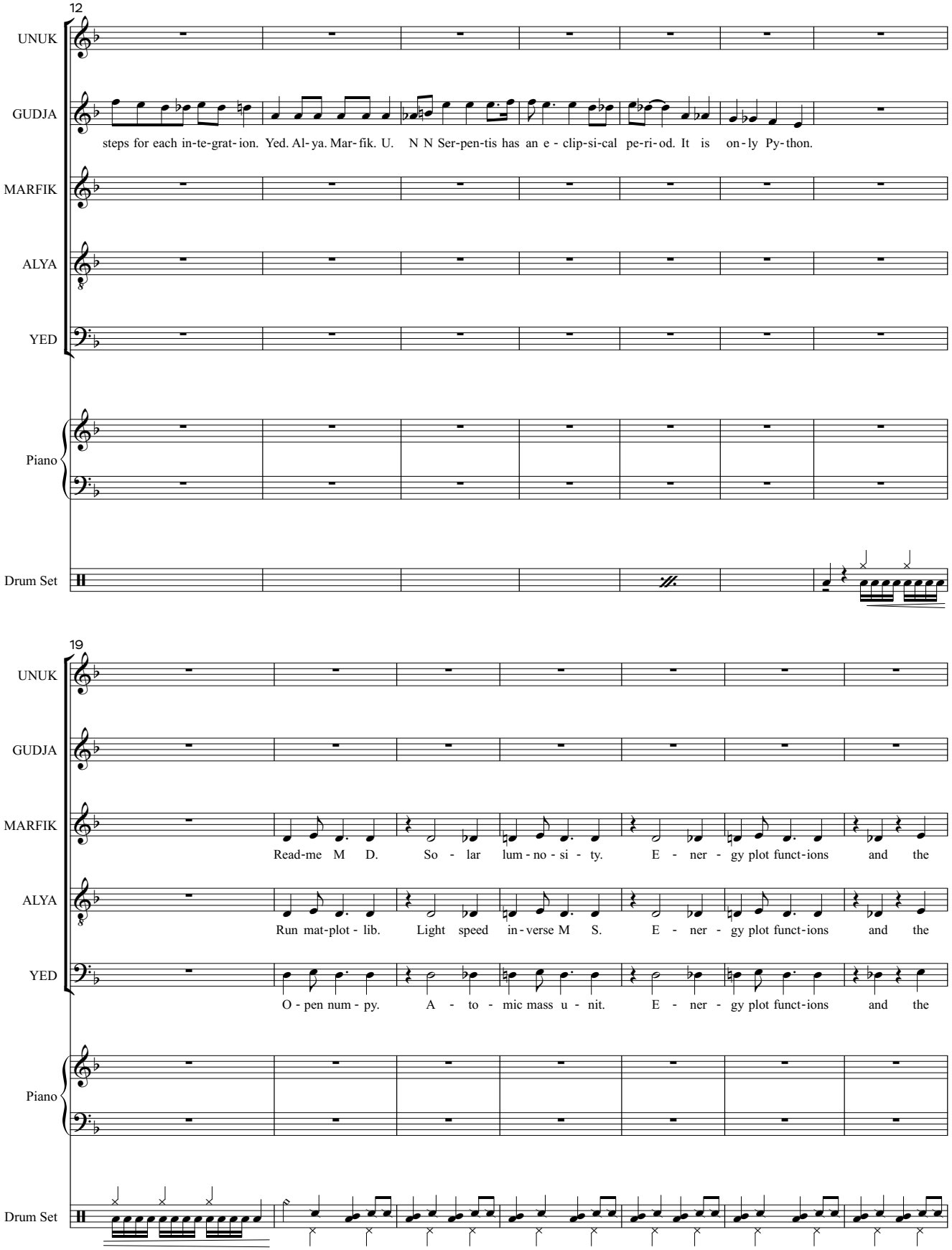
MARFIK

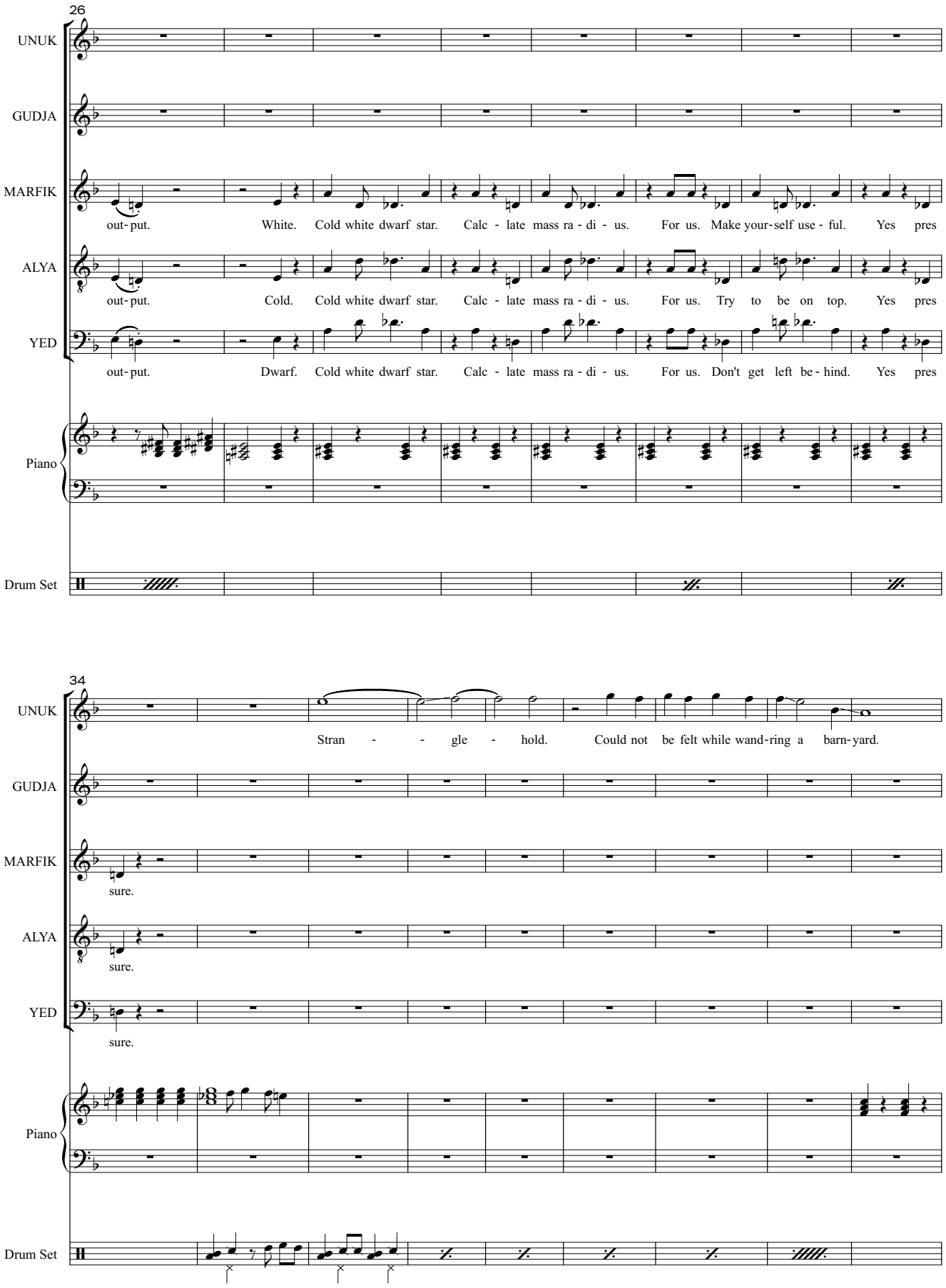
ALYA

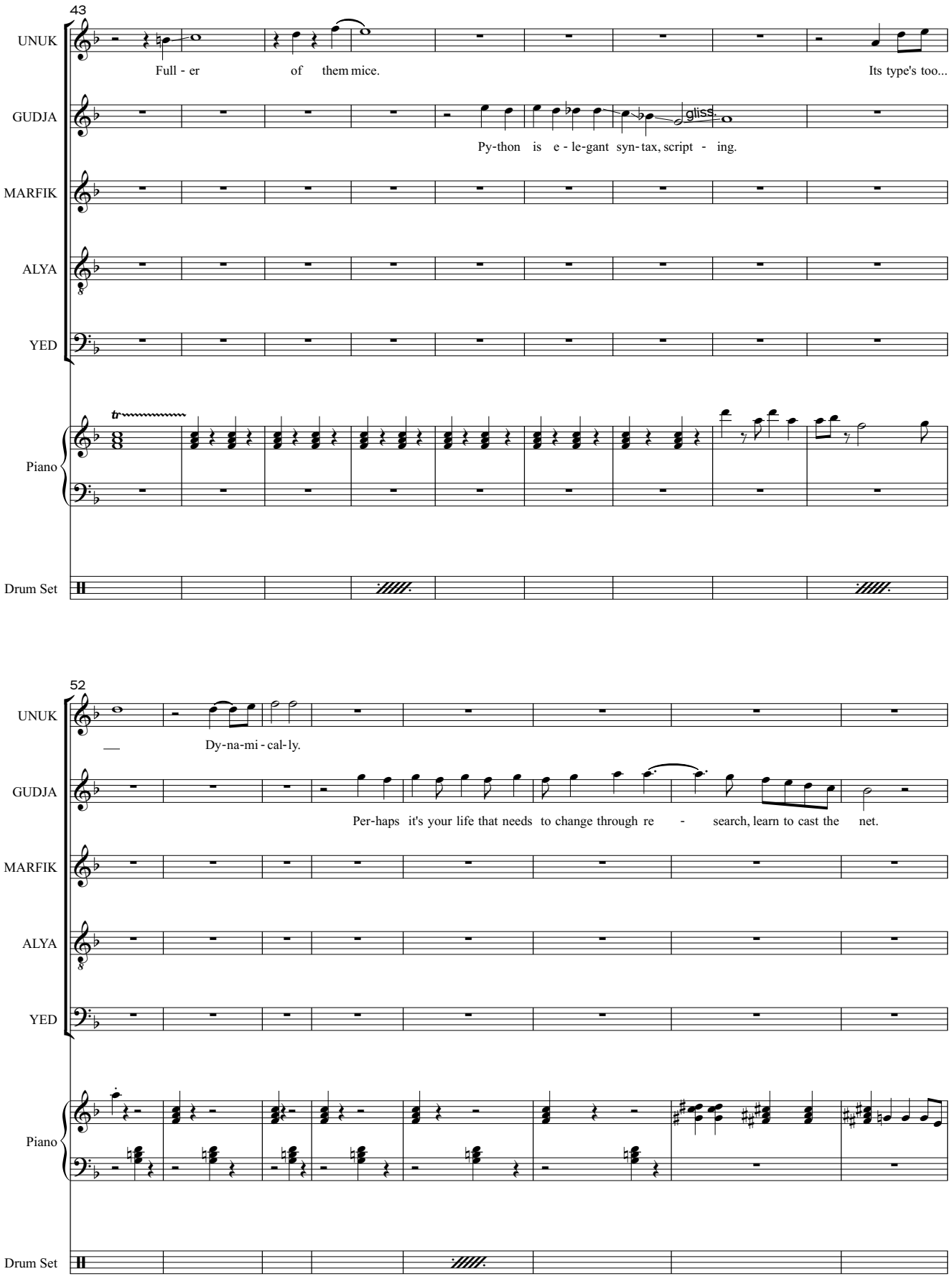
YED

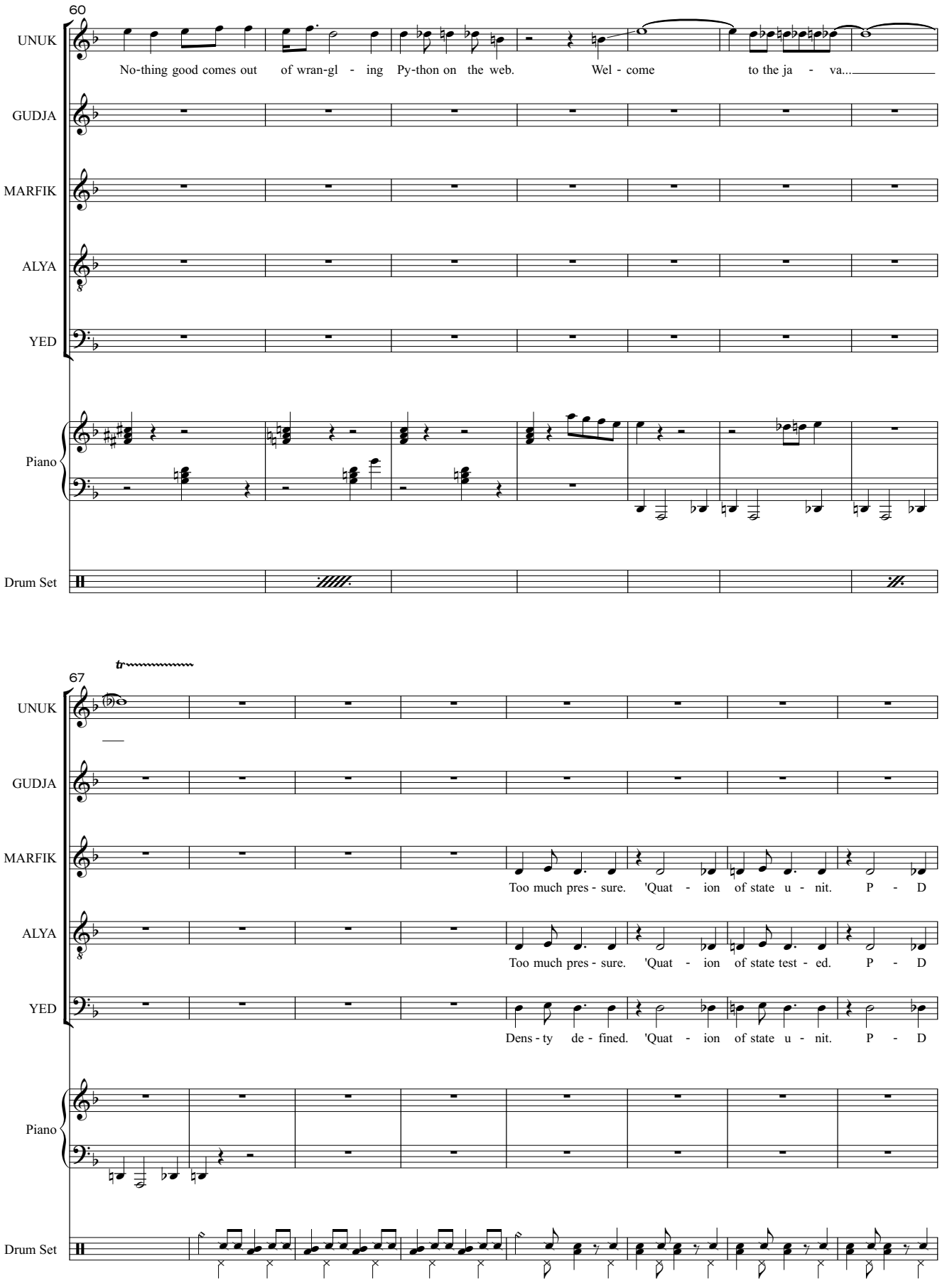
Piano

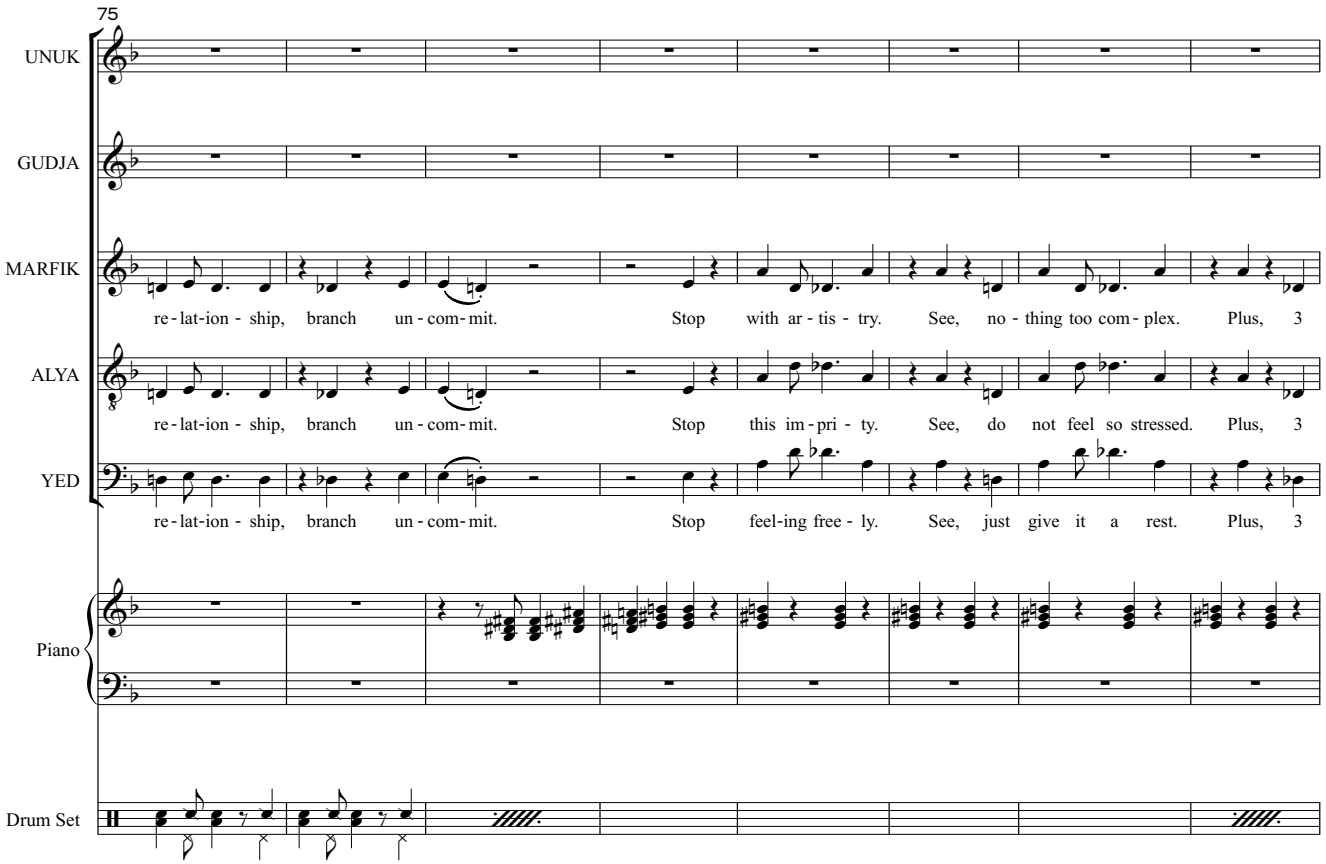
Drum Set

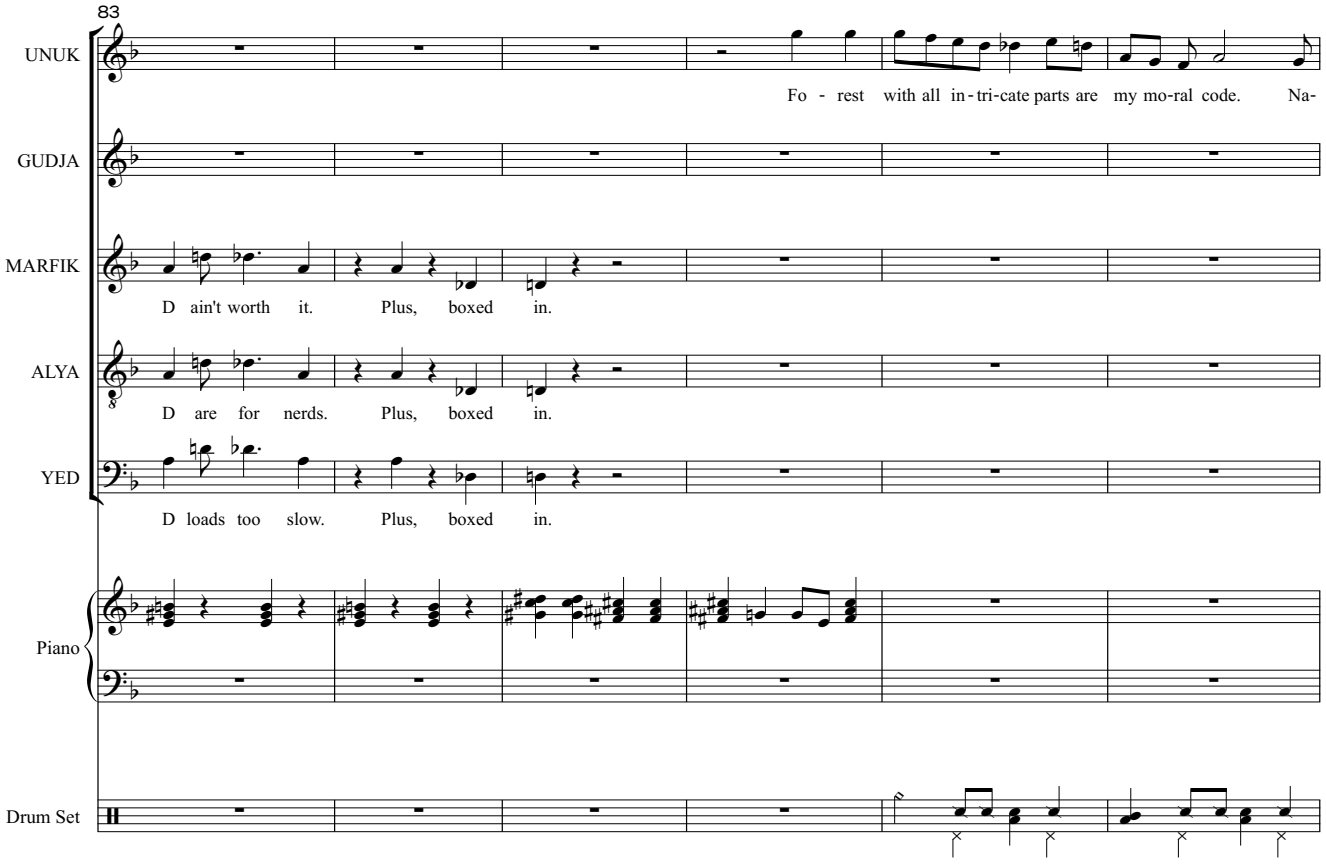

12
UNUK
GUDJA
steps for each in-te-grat-ion. Yed. Al-ya. Mar-fik. U. N N Ser-pen-tis has an e-clip-si-cal pe-ri-od. It is on-ly Py-thon.
MARFIK
ALYA
YED
Piano
Drum Set
19
UNUK
GUDJA
MARFIK
Read-me M D. So - lar lum-no-si-ty. E - ner - gy plot funct-ions and the
ALYA
Run mat-plot-lib. Light speed in-verse M S. E - ner - gy plot funct-ions and the
YED
O-pen num-py. A - to - mic mass u - nit. E - ner - gy plot funct-ions and the
Piano
Drum Set

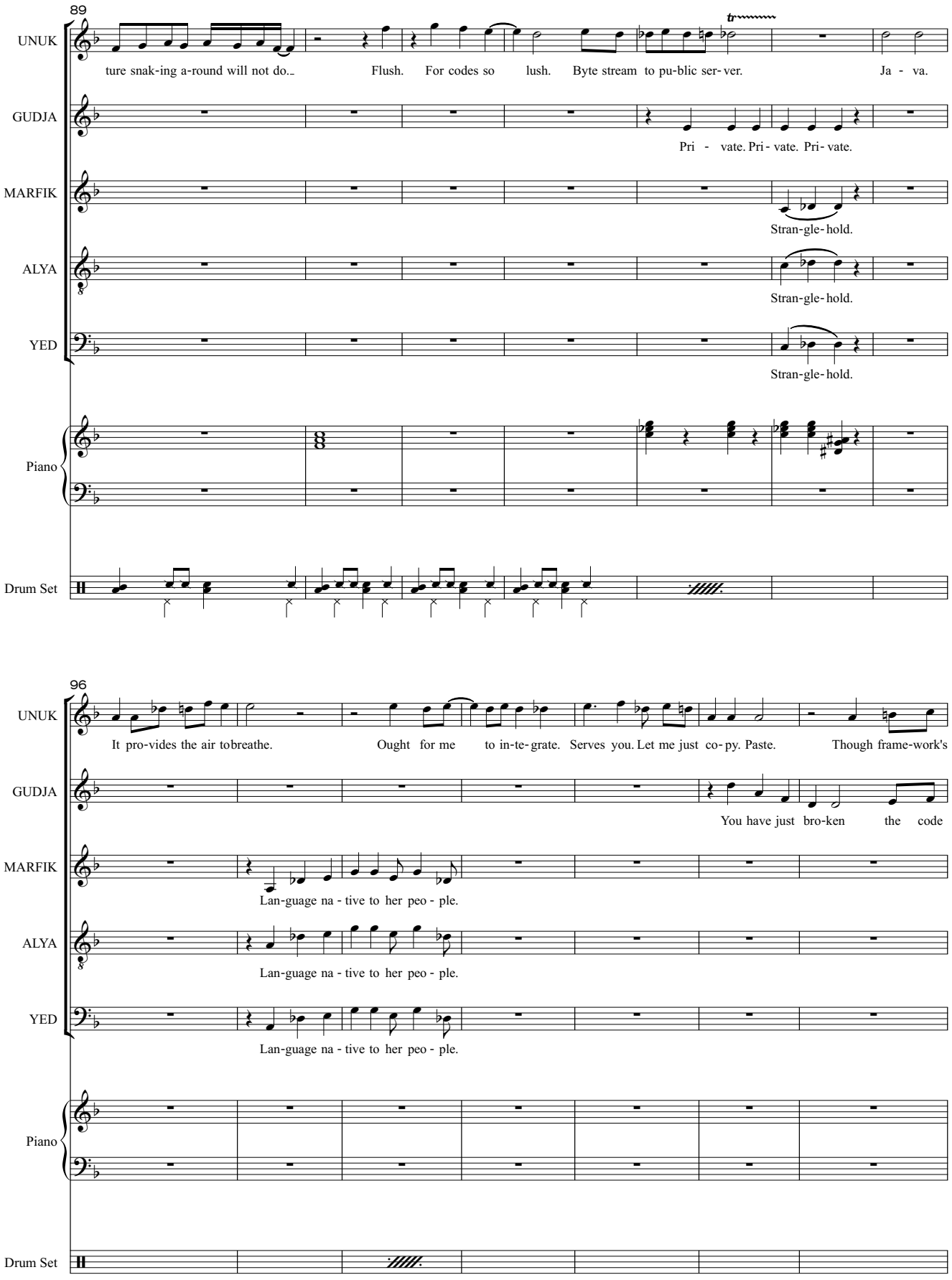

26
UNUK
GUDJA
MARFIK
ALYA
YED
Piano
Drum Set
out- put. White. Cold white dwarf star. Calc - late mass ra - di - us. For us. Make your-self use - ful. Yes pres
out- put. Cold. Cold white dwarf star. Calc - late mass ra - di - us. For us. Try to be on top. Yes pres
out- put. Dwarf. Cold white dwarf star. Calc - late mass ra - di - us. For us. Don't get left be - hind. Yes pres
34
Stran - - gle - hold. Could not be felt while wand-ring a barn- yard.
sure.
sure.
sure.

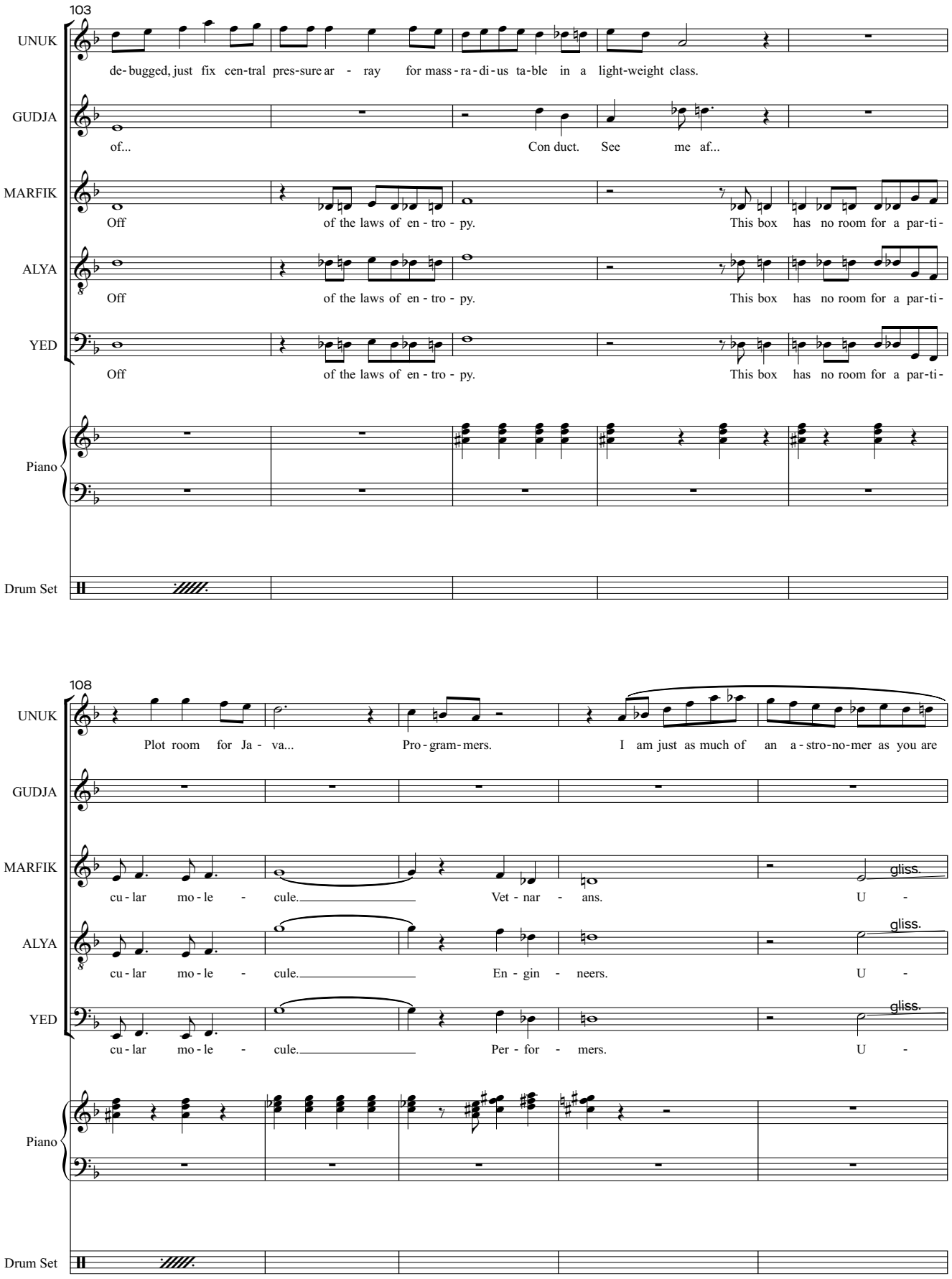

43
UNUK
Full - er of them mice.
Its type's too...
GUDJA
gliss.
Py-thon is e - le-gant syn-tax, script - ing.
MARFIK
ALYA
YED
tr
Piano
Drum Set
52
UNUK
Dy-na-mi - cal-ly.
GUDJA
Per-haps it's your life that needs to change through re - search, learn to cast the net.
MARFIK
ALYA
YED
Piano
Drum Set

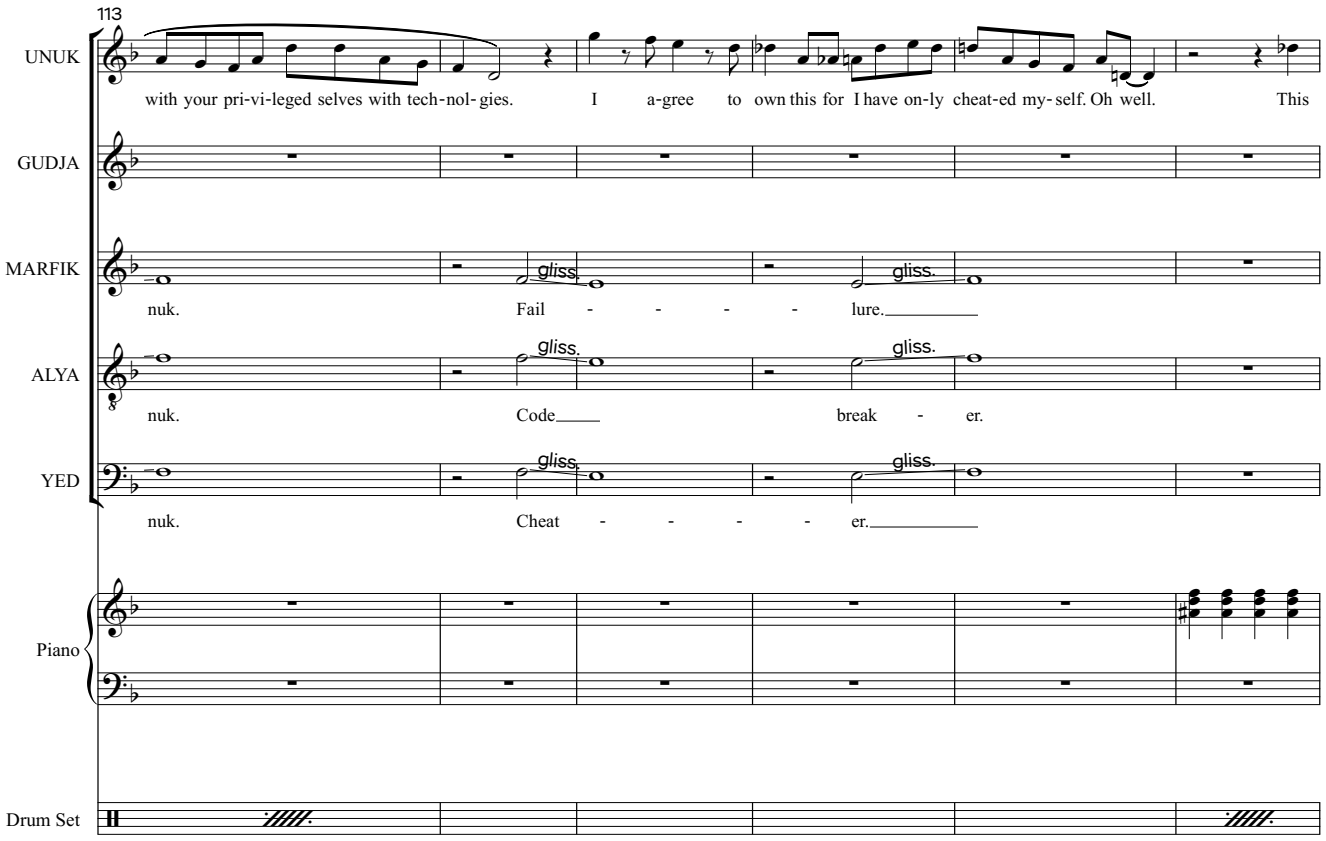

60
UNUK
No-thing good comes out of wran-gl - ing Py-thon on the web. Wel - come to the ja - va...
GUDJA
MARFIK
ALYA
YED
Piano
Drum Set
67
tr
UNUK
GUDJA
MARFIK
Too much pres - sure. 'Quat - ion of state u - nit. P - D
ALYA
Too much pres - sure. 'Quat - ion of state test - ed. P - D
YED
Dens - ty de - fined. 'Quat - ion of state u - nit. P - D
Piano
Drum Set

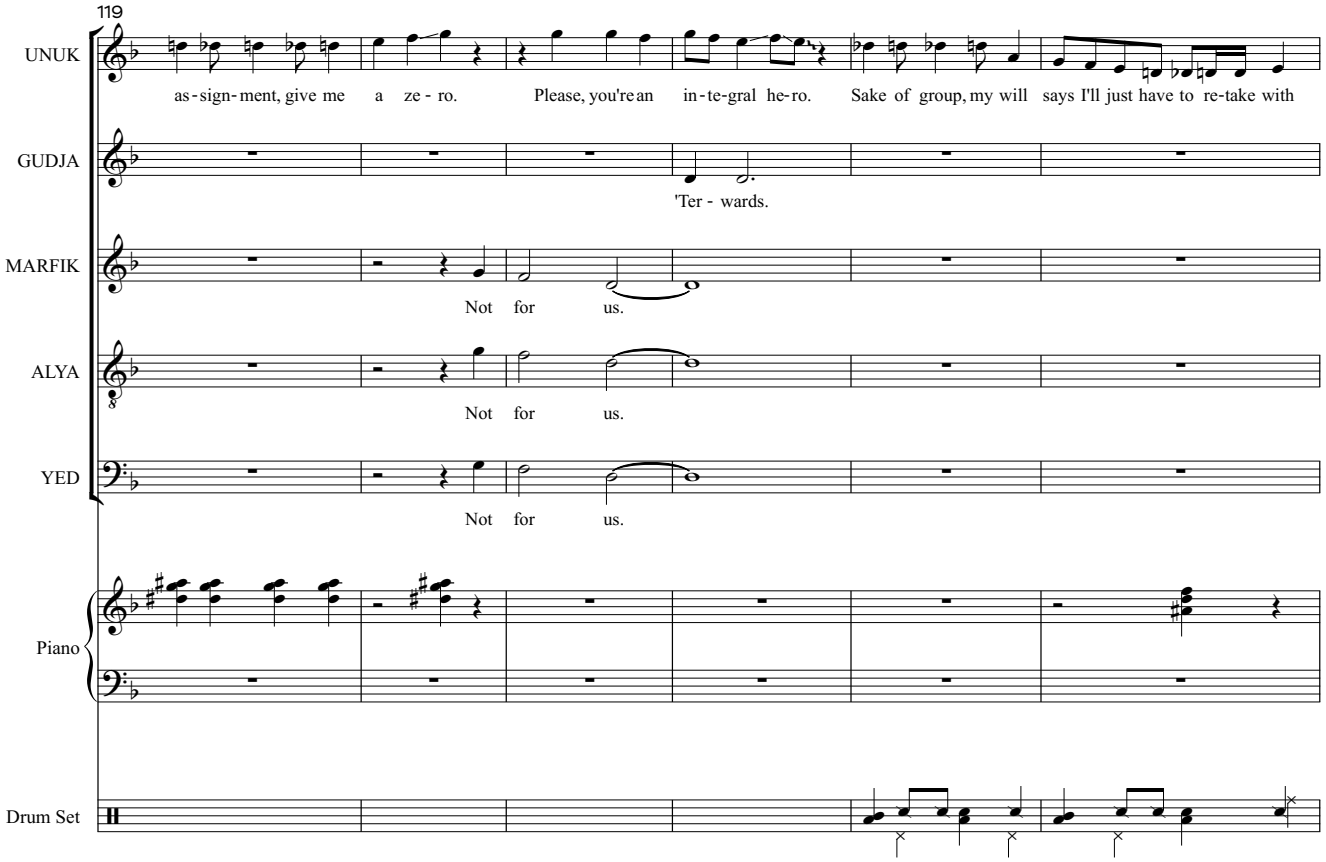

75
UNUK
GUDJA
MARFIK
re - lat-ion - ship, branch un - com- mit. Stop with ar - tis - try. See, no - thing too com - plex. Plus, 3
ALYA
re - lat-ion - ship, branch un - com- mit. Stop this im - pri - ty. See, do not feel so stressed. Plus, 3
YED
re - lat-ion - ship, branch un - com- mit. Stop feel-ing free - ly. See, just give it a rest. Plus, 3
Piano
Drum Set

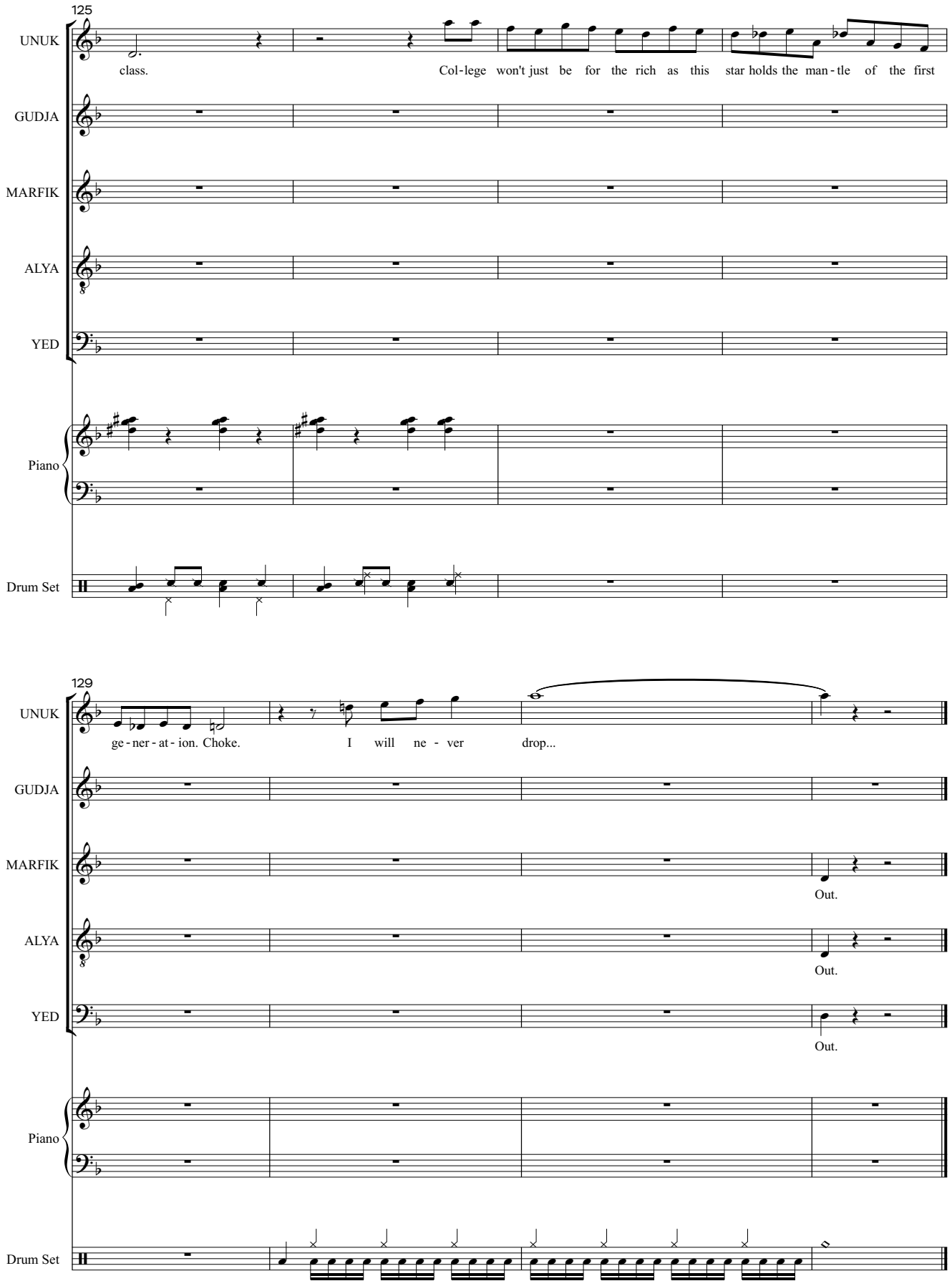

83
UNUK
Fo - rest with all in - tri-cate parts are my mo-ral code. Na-
GUDJA
MARFIK
D ain't worth it. Plus, boxed in.
ALYA
D are for nerds. Plus, boxed in.
YED
D loads too slow. Plus, boxed in.
Piano
Drum Set


89
UNUK
ture snak-ing a-round will not do.
Flush. For codes so lush. Byte stream to pu-blic ser- ver.
Ja - va.
GUDJA
Pri - vate. Pri - vate. Pri - vate.
MARFIK
Stran-gle-hold.
ALYA
Stran-gle-hold.
YED
Stran-gle-hold.
Piano
Drum Set
96
UNUK
It pro-vides the air tobreathe.
Ought for me to in-te-grate. Serves you. Let me just co-py. Paste.
Though frame-work's
GUDJA
You have just bro-ken the code
MARFIK
Lan-guage na - tive to her peo - ple.
ALYA
Lan-guage na - tive to her peo - ple.
YED
Lan-guage na - tive to her peo - ple.
Piano
Drum Set


103
UNUK
de- bugged, just fix cen-tral pres-sure ar - ray for mass - ra - di - us ta-ble in a light-weight class.
GUDJA
of... Con duct. See me af...
MARFIK
Off of the laws of en - tro - py. This box has no room for a par-ti-
ALYA
Off of the laws of en - tro - py. This box has no room for a par-ti-
YED
Off of the laws of en - tro - py. This box has no room for a par-ti-
Piano
Drum Set
108
UNUK
Plot room for Ja - va... Pro - gram-mers. I am just as much of an a - stro-no-mer as you are
GUDJA
MARFIK
cu - lar mo - le - cule. Vet - nar - ans. U -
gliss.
ALYA
cu - lar mo - le - cule. En - gin - neers. U -
gliss.
YED
cu - lar mo - le - cule. Per - for - mers. U -
gliss.
Piano
Drum Set


113
UNUK
with your pri-vi-leged selves with tech-nol-gies. I a-gree to own this for I have on-ly cheat-ed my-self. Oh well. This
GUDJA
MARFIK
gliss.
nuk. Fail - - - - lure.
ALYA
gliss.
nuk. Code break - er.
YED
gliss.
nuk. Cheat - - - - er.
Piano
Drum Set


119
UNUK
as-sign-ment, give me a ze - ro. Please, you're an in-te-gral he-ro. Sake of group, my will says I'll just have to re-take with
GUDJA
'Ter - wards.
MARFIK
Not for us.
ALYA
Not for us.
YED
Not for us.
Piano
Drum Set

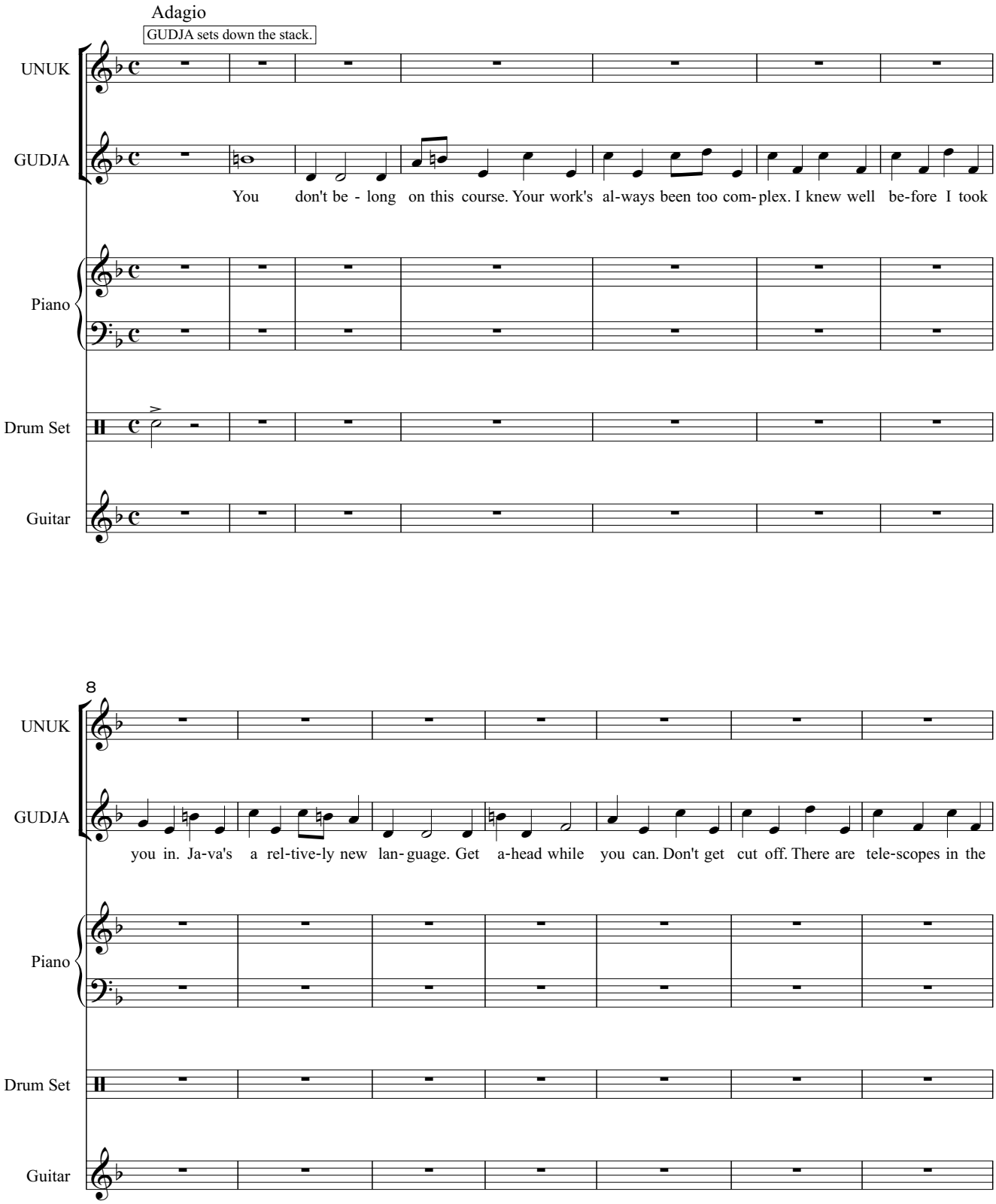

125
UNUK
class.
Col-lege won't just be for the rich as this star holds the man-tle of the first
GUDJA
MARFIK
ALYA
YED
Piano
Drum Set
129
UNUK
ge-ner-at-ion. Choke.
I will ne-ver drop...
GUDJA
MARFIK
Out.
ALYA
Out.
YED
Out.
Piano
Drum Set

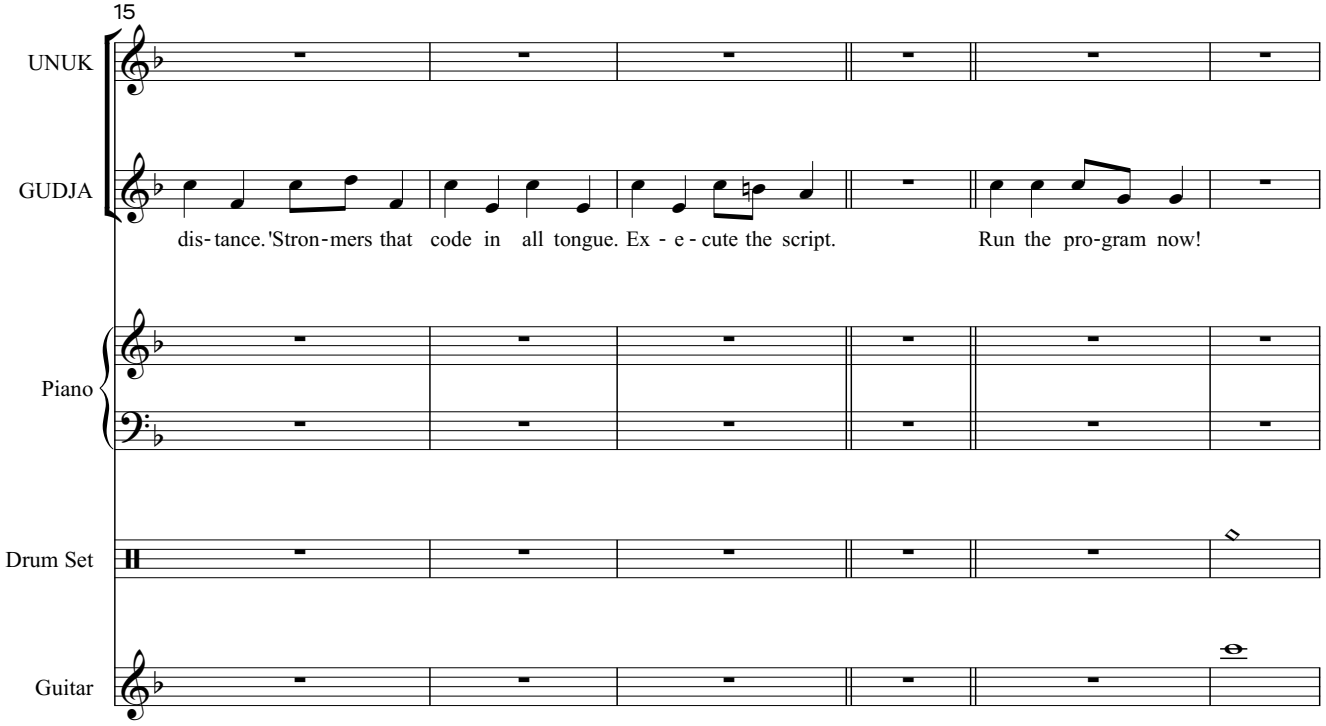
Score

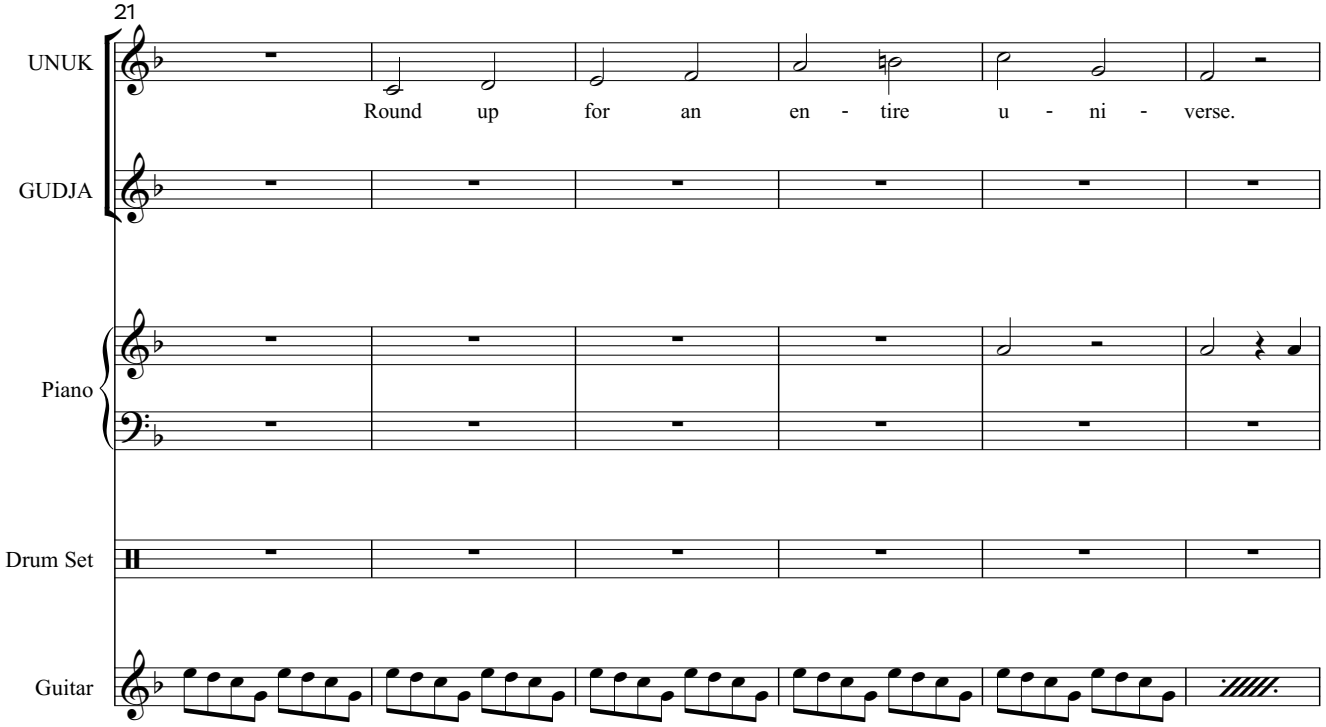
3SLITHER OFF

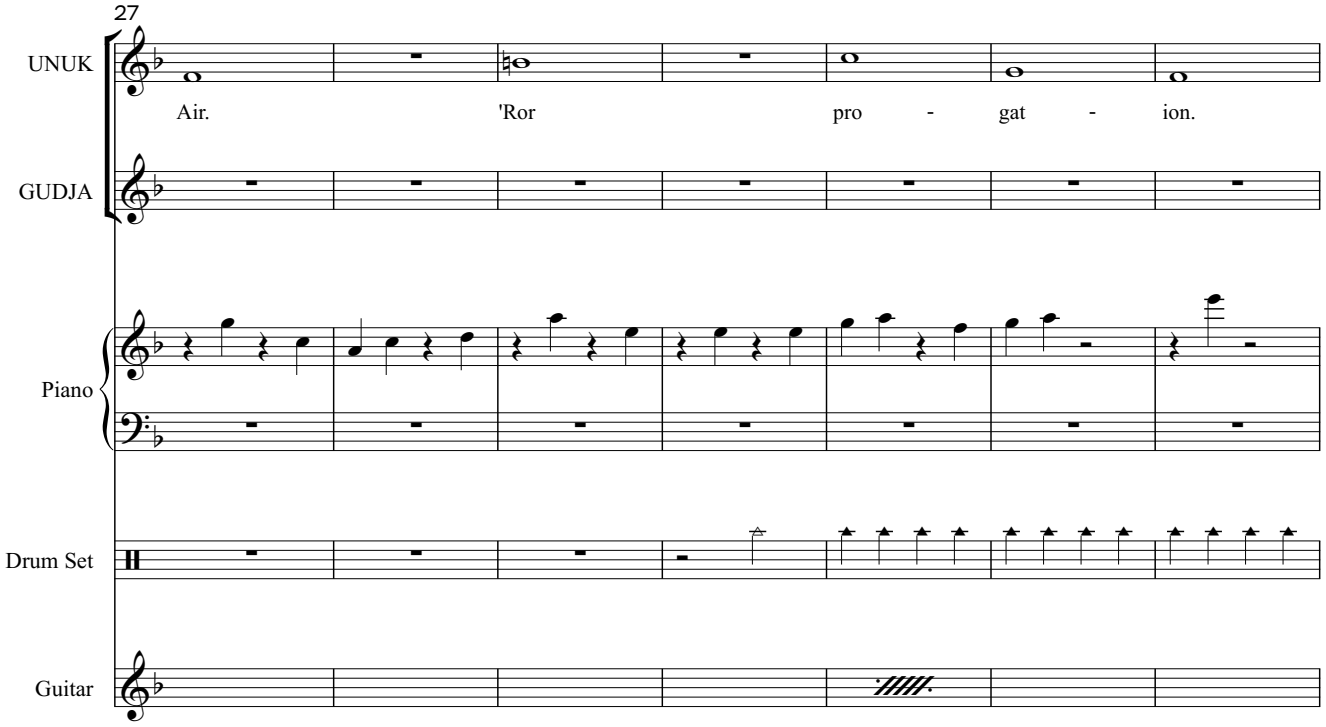
Snakeshit

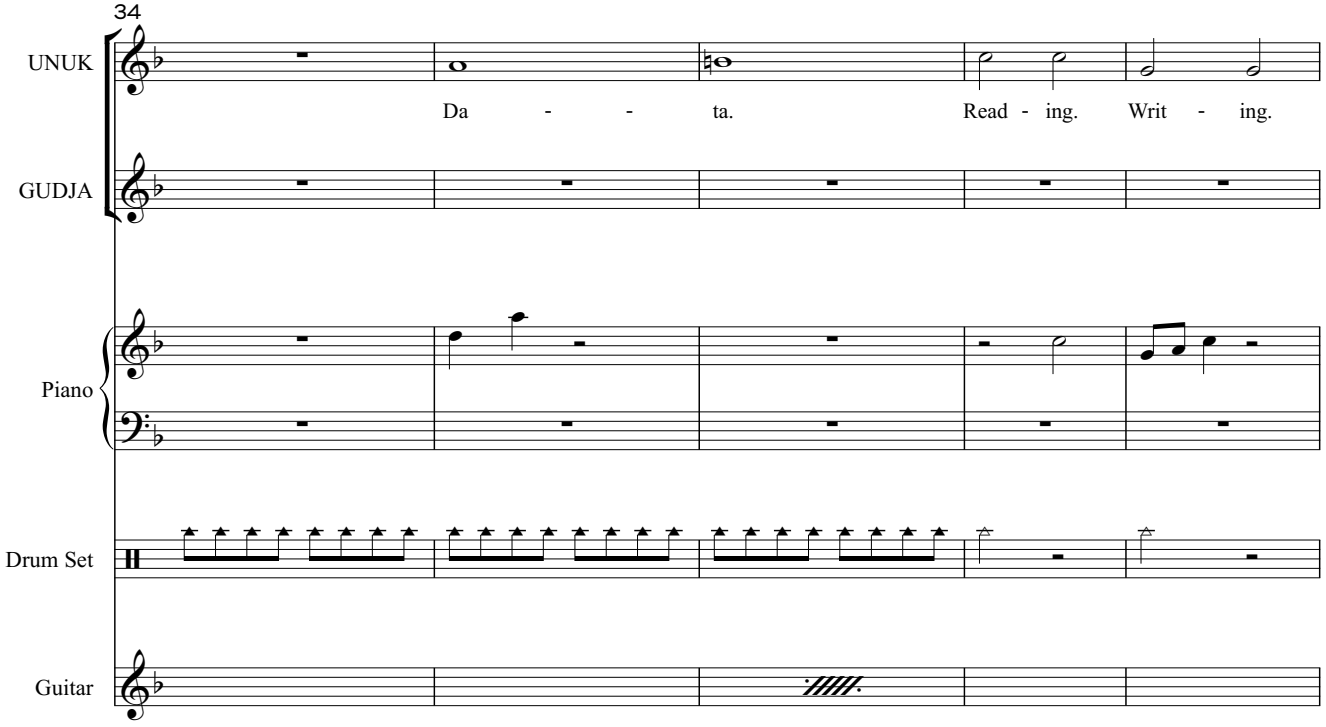
D. Q. PHAM

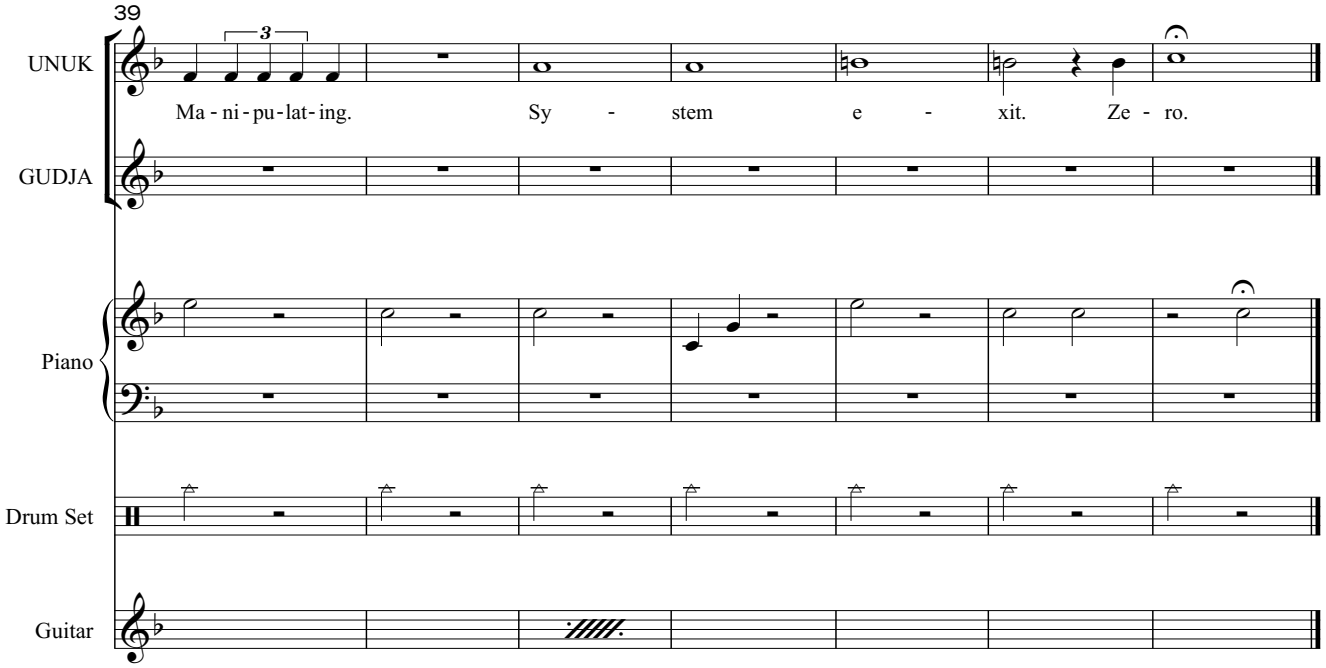



15
UNUK
GUDJA
dis- tance.'Stron- mers that code in all tongue. Ex - e - cute the script. Run the pro- gram now!
Piano
Drum Set
Guitar


21
UNUK
Round up for an en - tire u - ni - verse.
GUDJA
Piano
Drum Set
Guitar


27
UNUK
Air.
'Ror
pro - gat - ion.
GUDJA
Piano
Drum Set
Guitar


34
UNUK
Da - - ta.
Read - ing.
Writ - ing.
GUDJA
Piano
Drum Set
Guitar


39
UNUK
Ma - ni - pu - lat - ing.
Sy - stem e - xit.
Ze - ro.
GUDJA
Piano
Drum Set
Guitar