

Eulympiad Music Award

Final assignment for the

A-lympiad 2007

Garderen,
March 16 and 17 2007



GUIDE FINAL MATHEMATICS A-LYMPIAD 2007

IN ADVANCE:

- First read the full text of the assignment so you will know what you have to do this weekend. (You have already done Assignment A)
- Divide tasks where possible and consult when needed.
- Part B serves as preparation for Part C; so you cannot change the order.
- Check whether all available ICT is working, and whether the CD ROM with data is okay.

TIME MANAGEMENT:

- Keep an eye on the time used for work on the different parts.
- After dinner you will be handed the combined Eulympiad Music Award top 20 (assignment A).
- Be sure to start on part B in time (suggestion: between dinner and Happy Hour)
- You have to hand in your report Saturday afternoon by 14:00.
- There is a special collective closing program from 14.15 to 15.45

HANDING IN:

The developed answers for all parts. You may not hand in Excel files, the report must be understandable without these files.

The jury will receive copies of your work. Of course, the copies will need to be legible. Therefore use a black pen for writing and only print on A4 size paper. Any drawings that you hand in, must copy well, and it is therefore better to not make them with a pencil.

JUDGING:

Among others, the following points are important for the jury:

- How complete the answers for the various parts are;
- The use of math;
- The argumentation used and how choices that have been made are justified;
- The depth to which the various assignments have been answered;
- The style of presentation: form, legibility, (copyable) illustrations etc;
- Originality and creativity.

Eulympiad Music Award

The Top 2000, which is broadcast by Radio2 every year, is an example of a list that is compiled from over a million sub lists; the personal lists of participating listeners.

Lists are at the core of this final assignment. How do you compile a new list from sub lists? With the aid of recently published lists, you will do a preliminary investigation. You can use the results from that for the final assignment. In this assignment you will 'verify' a list that was compiled earlier (with the virtual winner of the *Eulympiad Music Award* at the top), using an enormous amount of data: the Top 2000 lists from all eight editions.

The Assignment

The assignment contains three parts:

Part A: who will win the Eulympiad Music Award?

you will place a number of artists in order of preference. In your team you will combine these lists in a common top 20.

Part B: combining lists

in which you will research how to combine a given number of sub lists into a new list.

Part C: Final assignment the Eulympiad Music Award and the Top2000

in which, with the aid of the eight Radio2 Top 2000 lists, you construct a top 20 of the best artists of all time, justify it and compare it to the Eulympiad Music Award list.

Part A: who will win the Eulympiad Music Award?

You see here an alphabetic list of 35 artists, nominated by the Alympiad commission, from more or less recent pop music history. No doubt you have heard of most of these artists and you may even know some of their songs. You probably have a preference for certain artists, without knowing exactly what you base that preference on. That is probably the case for most people; some people do prefer the Stones over the Beatles...

10CC	John Denver
ABBA	Madonna
Beach Boys	Michael Jackson
Beatles	Moody Blues
Bee Gees	Neil Diamond
Billy Joel	Phil Collins
Bob Dylan	Pink Floyd
Bruce Springsteen	Police
Bryan Adams	Queen
Coldplay	REM
Creedence Clearwater Revival	Robbie Williams
David Bowie	Rolling Stones
Dire Straits	Simon & Garfunkel
Eagles	Stevie Wonder
Elton John	Sting
Elvis Presley	Supertramp
Fleetwood Mac	U2
Golden Earring	

assignment 1

The question for you *personally* now is: place the 35 nominated artists on this list in order of preference. Do not take just your personal preference into account, but try to empathise with the preferences of European music lovers. Write down in brief which arguments you took into account.

assignment 2

Every member of your team has now made such a weighted order. Now, based on your lists, make one collective list of the twenty best artists. Every member of your team has now made such a weighted order. Now compile, based on your individual lists, one collective lists of the best twenty artists. Think up for yourselves how to create this collective list on the basis of the three or four personal lists. Motivate your choices!
Hand in this top 20 to the organisation by 11.30 at the latest, with a short overview of how you compiled it and the reasons for your choices.

Part B: combining lists

SUSTAINABILITY INDEX

Banks lend money to people and companies. In this part of the assignment we will look at the lending of money by banks to foreign companies. There are many factors that determine how 'eager' a bank is to invest in a particular foreign country. We will examine three categories of factors:

1. economic
2. social
3. environmental.

Economic factors give an indication of whether a bank can be confident of seeing its money again. This is of course very important for the primary goal of most banks, making money. However, it is no longer seen as socially acceptable that banks enrich themselves at every price.

Therefore banks also take social factors into account. What, for example, is the state of human rights in the country where one has an investment opportunity?

And now that Al Gore has told us his *Inconvenient Truth*, would we want a bank to invest our savings in a country that does not take the environment seriously?

The above factors and aspects are often expressed in a '(report) number'. To determine this number, use is made of data from various organisations, such as Unicef, the World Economic Forum and statistics agencies (such as our own CBS).

It is possible to make lists of countries on the basis of each of these factors. One could for example make a list in which the various countries are ordered exclusively on the basis of the economy: the economic-index, or a list that looks solely at the efforts a country makes on behalf of the environment.

Banks want to know how the various countries handle all these factors, so that they can make a kind of preference list.

Economists have recently compiled such a combined list. They determined a so-called *sustainability index* for every country and then ordered the countries according to this index. To do this, they made use of three sub lists.

In the Excel file 'sustainability ranking.xls' you will find all the data:

SUSTAINABILITY RANKING.xls							
	A	B	C	D	E	F	G
1	nr	country	ECONOMY		SOCIAL		ENVIRONMENT
2	1	Finland	1,5		4		1
3	2	Sweden	5		2		2
4	3	Iceland	10		1		5
5	4	Denmark	3		3		12
6	5	Norway	13		5		4
7	6,5	New Zealand	15		6		6
8	6,5	Switzerland	4		11,5		10
9	8	Canada	12		8,5		7
10	9	Australia	11		7		14
11	10	Austria	14		13		8
12	11	UK	7		8,5		23

- Column A: the sustainability ranking based on which banks can decide to invest in certain countries.
- Column B: the name of the country
- Column C: the economic index
- Column E: the social index
- Column G: the environmental index

The 6,5 in column A indicates that the countries of New Zealand and Switzerland are in shared sixth place in the list.

Finland heads the list in the area of sustainability. However, Finland does not have the highest score for all aspects. Socially Finland does less well than countries like Sweden and Iceland.

assignment 3

Which of the three sub lists, economic, social or environmental, does the sustainability index correspond with most in the end? Substantiate your answer with numerical proof!

assignment 4

Work out how the sustainability index is constructed on the basis of the three sub lists. Try to reconstruct the order for sustainability as exactly as possible based on the sub lists.

assignment 5

Joni claims that such a system of combining lists can never be fair. Do you agree with that? Motivate your opinion with (may be made up) numerical examples.

YOUTH

The Bank for Youth (BVJ bank) wants to target young people; “the hand that rocks the cradle rules the world”. Very recently Unicef published the results of a very interesting study:



Door een onzer redacteurs
ROTTERDAM, 14 FEBR. Nederlandse kinderen zijn het gelukkigst van alle kinderen in de westerse wereld. Dat blijkt uit het een onderzoek van het VN-kinderfonds Unicef. Nederland staat bovenaan omdat kinderen zelf aangeven zeer gelukkig te zijn met hun leven. Daarnaast lopen ze weinig gezondheidsrisico's en hebben ze een goede band met hun familie.

Na Nederland wordt de lijst gedomineerd door de kleinere Noord-Europese landen: Zweden (tweede plaats), Denemarken (nummer drie) en Finland. Onderaan staan de Verenigde Staten en Groot-Brittannië.

De hulporganisatie Unicef heeft het welzijn van kinderen in 21 landen die lid zijn van de OESO (de Organisatie voor Economische Samenwerking en Ontwikkeling) vergeleken aan de hand van zes indicatoren: armoede, gezondheid en veiligheid, onderwijs, familie- en vriendenrelaties, risicovol ge-

Nederlands kind voelt zich het gelukkigst

drag (als drugsgebruik) en de mate van het eigen geluksgevoel.

Materiële welvaart is de minst doorslaggevende factor in het welzijn van Nederlandse kinderen. Die wordt in de studie gemeten naar het aantal kinderen dat leeft in gezinnen die moeten rondkomen van een inkomen dat lager is dan modaal. Polen en Ierland scoren op dit vlak heel laag. Zweden en Noorwegen juist hoog.

Volgens onderzoekers bestaat er geen verband tussen de materiële welvaart in een land, geme-

ten naar bruto binnenlands product, en de kwaliteit van leven van kinderen. Zo zijn kinderen in Tsjechië gelukkiger dan in Frankrijk en Groot-Brittannië ook al zijn deze landen welvarender.

Het onderzoek is gebaseerd op cijfers afkomstig van internationale bronnen, waaronder Health Behaviour of School Age Children van de wereldgezondheidsorganisatie WHO en het Programme for International Student Assessment van de OESO.

Groot-Brittannië scoort het slechtst in de categorieën 'relatie met familie', 'riskant gedrag' en 'het eigen gevoel van welbevinden van kinderen'. Staatssecretaris Jim Murphy van Sociale Zaken verklaarde tegenover de BBC dat Unicef in het onderzoek verouderde gegevens heeft gebruikt. De situatie zou de afgelopen vijf tot acht jaar op verschillende gebieden verbeterd zijn.

Lees het complete rapport op nrc.nl/binnenland

Source: NRC 15 February 2007

This study compiled a list of the child well-being (up to age 18) based on a number of sub lists: (see also the Excel file 'Unicef.xls').

The chart below presents the findings of this *Report Card* in summary form. Countries are listed in order of their average rank for the six dimensions of child well-being that have been assessed.¹ A light blue background indicates a place in the top third of the table; mid-blue denotes the middle third and dark blue the bottom third.

Dimensions of child well-being	Average ranking position (for all 6 dimensions)	Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5	Dimension 6
		Material well-being	Health and safety	Educational well-being	Family and peer relationships	Behaviours and risks	Subjective well-being
Netherlands	4.2	10	2	6	3	3	1
Sweden	5.0	1	1	5	15	1	7
Denmark	7.2	4	4	8	9	6	12
Finland	7.5	3	3	4	17	7	11
Spain	8.0	12	6	15	8	5	2
Switzerland	8.3	5	9	14	4	12	6
Norway	8.7	2	8	11	10	13	8
Italy	10.0	14	5	20	1	10	10
Ireland	10.2	19	19	7	7	4	5
Belgium	10.7	7	16	1	5	19	16
Germany	11.2	13	11	10	13	11	9
Canada	11.8	6	13	2	18	17	15
Greece	11.8	15	18	16	11	8	3
Poland	12.3	21	15	3	14	2	19
Czech Republic	12.5	11	10	9	19	9	17
France	13.0	9	7	18	12	14	18
Portugal	13.7	16	14	21	2	15	14
Austria	13.8	8	20	19	16	16	4
Hungary	14.5	20	17	13	6	18	13
United States	18.0	17	21	12	20	20	-
United Kingdom	18.2	18	12	17	21	21	20

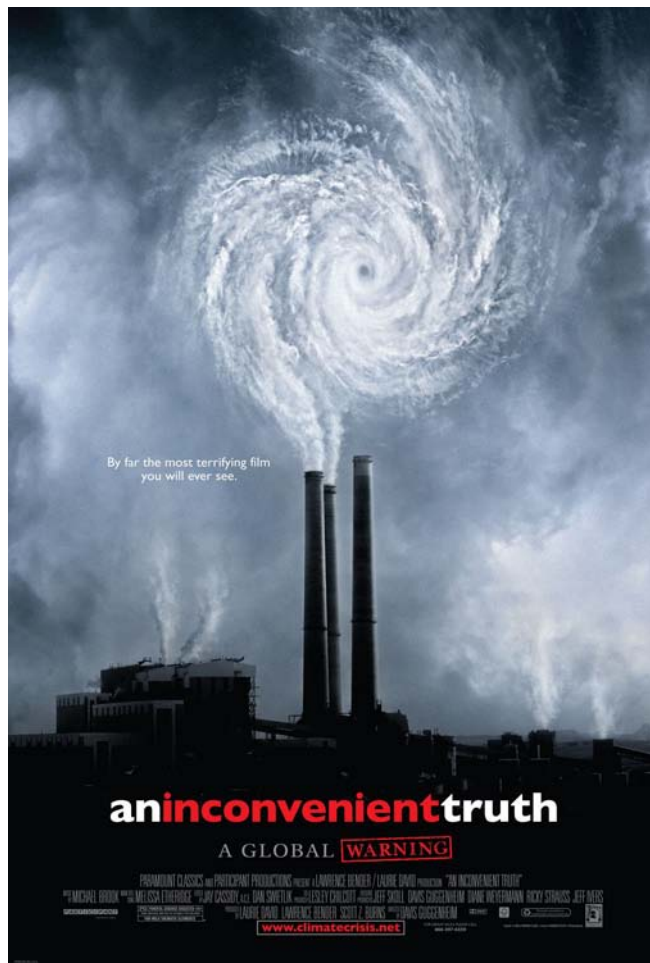
OECD countries with insufficient data to be included in the overview: Australia, Iceland, Japan, Luxembourg, Mexico, New Zealand, the Slovak Republic, South Korea, Turkey.

The BVJ bank wants to include the data on child well-being as a factor in the sustainability index. The bank also wants to reconsider the weighting of the other factors.

assignment 6

Add this index on child well-being to the sustainability index. Choose whether you want to copy it as a whole, or whether you want to include just one or more of the sub factors. Either way, motivate your choice!

Determine a new sustainability ranking and describe with arguments how it was created. Also decide how you would handle missing or 'new' countries (See also the footnote under the well-being list)



Part C Final assignment: the Eulympiad Music Award and the Top2000

The Radio2 Top 2000 is a household word in the Netherlands, and started out as a playful ending to the last century. Listeners sent in lists of their favourite songs, and the Top 2000 that was compiled from that filled that last six days of the twentieth century on Radio2. As it was a raging success, the event has been repeated every year since, and has by now morphed into a radio event of unprecedented size.

In December 2006 the Top 2000 was broadcast for the eighth time.

The Top 2000 list is available for every year. These eight lists with each 2000 songs are a tremendous source of statistical data. You will find all eight on the CD-ROM¹. In the most recent list you will find, for example, the following data:

1896 Joni Mitchell Big yellow taxi 1970 0 1819 1990 1765 1369 1276 1860 0:02:16



This tells you that the song 'Big yellow taxi' by Joni Mitchell was in 1896th place in 2006. This song came out in 1970. In 1999 it was not in the list (0), after which the rankings in the years 2000 to 2005 are listed. Finally you also find the length of the song.

Please note: in earlier editions 'X' was used to indicate that a song was not listed.

¹ (our thanks to Petra Bosma (Radio2) for making the Top 2000 lists available).

The Top 2000 is a list of numbers (songs). You could also compile a list of best artists of all time based on the data from all the Top 2000 lists. There are of course all kinds of ways to do that, as shown by the discussion below

Ylja: *"the best band of all time is of course Queen. They were number 1 in 2006 with Bohemian Rhapsody."*

Youp: *"Nonsense, I'd say the Rolling Stones are more likely, because they are in the list a lot more in 2006: about 40 times, while Queen has only 19 entries"*

Mariam: *"That last is a nonsense argument, you could just as easily say that it doesn't say much: it might not say nothing at all about the quality of the band and the number of different songs may say a lot more about the 'age' of the band than over the quality: the Rolling Stones have been around so long, aren't they the dinosaurs of rock?"*

Afra: *"I think you shouldn't just look at 2006... I'd also take earlier years into account a little "*

Ralph: *"I think that, if I wanted to, I could come up with another twenty different arguments, all based on the Top 2000 lists, to determine the top 20 of the best artists of all time."*

Joni: *"...and the best one will get the Eulympiad Music Award."*

Final assignment A

Make a list of the factors you would take into account to determine the top 20 of best artists of all time (based on the data available in the Top 2000 lists). Make, for each of the three factors you find most important, a separate top 20 list from the 35 artists you ranked in part A. (There are separate Top 2000 Excel files for this).

Finally, make an order based on all your factors, describe how you did this and motivate your choices.

By now you will also have got back a top 20 list based on the lists you handed in. Both your top 20 and the Top 2000 are based on considerations and choices by a (large) number of people. So these are not random lists, even if the criteria are often implicit.

Final assignment B

Compare the list that was handed out with the top 20 you made in Final assignment A. Describe and explain similarities and differences and think of a measure that indicates the difference (or agreement) in order between the two lists.

Final assignment C

Now try, based on the data from the Top 2000, to reconstruct the top 20 that has been handed out. Indicate the factors you have used and how they may lead to the top 20 list. Substantiate your result not just with calculations, but with arguments as well.