FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

Assessment 1
Second Semester of 2023/2024

COURSE NAME : Mathematics for Multimedia Computing

CODE : SKM3002

PROGRAMME : Bachelor of Computer Science (Multimedia Computing) with Honours / Bachelor of Software Engineering with Honours

DURATION : 18 April – 28 April 2024 (11:59pm)

INSTRUCTIONS :

1. Strictly no plagiarism and only cite information from trusted sources.
2. Submit through PutraBlast the following items:-
   i. Technical Report (according to template)
   ii. Turnitin similarity report
   iii. Presentation aids

Latar Belakang Penilaian / *Assessment Background*

Sistem persamaan linear memainkan peranan penting dalam algebra linear. Banyak masalah boleh dirumuskan sebagai sistem persamaan linear, dan algebra linear merupakan alat untuk menyelesaikannya.

Systems of linear equations play a central part in linear algebra. Many problems can be formulated as systems of linear equations, and linear algebra gives us the tools for solving them.

Contoh:

Seorang pembuat kek menghasilkan kek-kek, $kek_1, \cdots, kek_n$ dengan sumber-sumber (contoh: tepung, gula, mentega, …) $bahan_1, \cdots, bahan_m$ yang diperlukan. Bagi menghasilkan satu unit kek_j, $a_{i,j}$ unit bahan $ingredient_i$ diperlukan, yang mana $i = 1, \ldots, m$ dan $j = 1, \ldots, n$.

Example:

A baker produces cakes, $cake_1, \cdots, cake_n$ for which resources (example: flour, sugar, butter, …) $ingredient_1, \cdots, ingredient_m$ are required. To make a unit of $cake_j$, $a_{i,j}$ units of resources $ingredient_i$ are needed, where $i = 1, \ldots, m$ and $j = 1, \ldots, n$.

$kek_1, \cdots, kek_n$ /
$cake_1, \cdots, cake_n$

$bahan_1, \cdots, bahan_m$ /
$ingredient_1, \cdots, ingredient_m$

Objektifnya adalah untuk merancangkan pengeluaran yang optimum, iaitu, satu perancangan berapa unit x_j produk kek_j boleh dihasilkan jika sejumlah b_i unit dari sumber $bahan_i$ ada dan (sebaiknya) tiada sumber yang berbaki. Jika kita hasilkan $x_1, \cdots, x_n$ unit bagi kek yang yang sepadan, kita memerlukan sejumlah $a_{i,1}x_1 + \ldots + a_{i,n}x_n$ unit sumber $bahan_i$. Pelan pengeluaran yang optimum $(x_1, \cdots, x_n) \in \Re^n$, oleh itu, perlu memenuhi sistem persamaan berikut:

The objective is to find an optimal production plan, i.e., a plan of how many units x_j of product $cake_j$ should be produced if a total of b_i units of resources $ingredient_i$ are available and (ideally) no resources are left over. If we produce $x_1, \cdots, x_n$ units of the corresponding cakes, we need a total of $a_{i,1}x_1 + \ldots + a_{i,n}x_n$ units of resources $ingredients_i$. An optimal production plan $(x_1, \cdots, x_n) \in \Re^n$, therefore, has to satisfy the following system of equations:

$$a_{1,1}x_1 + \cdots + a_{1,n}x_n = b_1$$
$$\vdots$$
$$a_{m,1}x_1 + \cdots + a_{m,n}x_n = b_m$$

Yang mana $a_{i,j} \in \Re \; and \; b_i \in \Re$, $a_{i,j}$ merupakan unit $bahan_i$ yang diperlukan dan x_j merupakan unit bagi kek_j yang boleh dihasilkan jika jumlah b_i unit $bahan_i$ sedia ada.

Where $a_{i,j} \in \Re \; and \; b_i \in \Re$, $a_{i,j}$ is the units of $ingredient_i$ that are needed and x_j is the units of $cake_j$ should be produced if a total of b_i units of $ingredient_i$ are available.

Tulis laporan teknikal dengan pengekodan anda untuk menyelesaikan kajian kes anda.

Write a technical report with your coding to solve your case study.

Tugasan anda adalah / *Your tasks are*:

i. Cadangkan satu tajuk unik untuk kajian kes anda.
Suggest a unique title for your case study.

ii. Hasilkan satu laporan kajian kes dan penyelesaian pengekodan. Pastikan laporan teknikal anda merangkumi **ketiga-tiga item berikut:-**
*Produce a case study report and coding solution. Ensure your technical report includes **all three of the following items:-***

- Latar belakang kajian kes dan pendekatan penyelesaian.
  Case study background and solution approach.
- Pemilihan pemboleh ubah dan tetapan bersama kaedah pengiraan, berdasarkan kajian kes anda.
  Selection of variables and settings as well as calculation methods, based on your case study.
- Kod pengaturcaraan dan komen.
  Programming code and comments.

iii. Muat naik laporan teknikal anda dalam *Turnitin* dan jana laporan kesamaan. **Kesamaan tidak boleh melebihi 20%**. Anda hanya boleh menjana paling banyak 3 kali sehari. Rancang penggunaan anda secara bijak.
*Upload your technical report into Turnitin and generate the similarity report. **The similarity should not exceed 20%. You can only generate the report at most three times a day, so plan** your usage wisely.*

iv. Hasilkan satu video *pitching* yang tidak lebih daripada 3 minit menggunakan Bahasa Inggeris.
Produce a pitching video of not more than 3 minutes using English Language.

Hasilkan laporan teknikal anda menggunakan Bahasa Inggeris (UK) dengan templet (SKM3002 Assessment 1 Template.docx) yang diberikan melalui *PutraBlast*.

Produce your technical report using English language (UK) with the template (SKM3002 Assessment 1 Template.docx) provided through PutraBlast.

Tiada had bilangan muka surat, kandungan yang lengkap adalah lebih penting. Subtopik boleh digunakan untuk menyusun penulisan anda.

No limitation on the number of pages, completeness of content is more important. Subchapters can be used to organise your writings.

Rubrik pemarkahan seperti dalam Lampiran 1.

The marking rubric is as in Attachment 1.

Muat naik item berikut dalam *PutraBlast* sebelum tarikh tutup penilaian.

Upload the following items in PutraBlast before assessment deadline.

- laporan teknikal anda
  your technical report
- laporan kesamaan *Turnitin*
  Turnitin similarity report
- video pitching anda (atau pautan)
  your pitching video (or link)

Criteria	Rubric				Weight
	Excellent (3M)	Good (2M)	Needs Improvement (1M)	Poor (0M)	
Introduction and Background	Detailed overview is presented.	Sufficient overview is presented.	Minimum overview is presented.	No overview is presented.	2%
Methodology and Calculation Steps	Detailed and comprehensive.	Presented, but lack of details and descriptions.	Vaguely presented.	Not presented or incorrect / irrelevant materials presented.	5%
Turnitin Similarity	<=20%	21 - 25%	26 - 30%	>30%	1%
Programming	Code executes perfectly and well structured. Comments (explanations) for all functions are provided.	Code is well structured, but still contain some irrelevant declarations. Insufficient comments (explanations) for all functions.	Code can be executed but data structure is not efficient. Minimal comments (explanations) provided.	No submission / Code cannot be executed. No comments (explanations) provided.	4%
Pitching Video	Student shows full understanding by presenting confidently, explaining all important contents, with suitable presentation aids.	Student presented confidently, explaining most contents, with insufficient presentation aids.	Student lacks confidence in presentation. Content is presented vaguely or just directly reading from slides.	Facts were presented wrongly, or no presentation video submitted.	3%
				Total	15%