

**LKS SMK**  
**Tingkat Nasional Ke-XXIII**  
**Tahun 2015**



**LKS SMK**  
Tingkat Nasional XXIII  
Serpong, 07-13 Juni 2015

**Soal**

**BIDANG LOMBA**

**IT-Software Application**

  
**SMK Bisa!**  
**Indonesia Bisa!**



**KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN**  
**DIREKTORAT JENDERAL PENDIDIKAN MENENGAH**  
**DIREKTORAT PEMBINAAN SEKOLAH MENENGAH KEJURUAN**  
Kompleks Kemdikbud Gedung E Lantai 12-13  
Jalan Jenderal Sudirman Senayan Jakarta 10270  
Telepon (021) 5725477 (hunting), 5725466-69, 5725471-75  
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## THE DEVELOPMENT OF ESEMKA TRAIN INFORMATION SYSTEM

ESEMKA Train is one of Indonesia state-owned companies who are moved in transportation sector. Being the only one of the train company in Indonesia, obviously ESEMKA Train has a very complex business process driving the Board of Director to develop an Information System (IS) to support their Business and give more competitive advantages to passengers.

The study below will concern the development of Information System to support ESEMKA Train core service, which is a commercial train, concerning critical process that corresponds to the commercial train, such as **Train Scheduling, Train Ticketing, On-Train Service, and Passenger Boarding**. Involved also in the business process of ESEMKA Train core service mentioned before, the department who will directly make use of the IS developed such as **Scheduling Department, Operation Department, Service Department, and Passenger Boarding Department**.

### Train Scheduling Process

Scheduling Department will input the train schedule for the following month on the third week of current month to the system. The details that will be inputted by the Scheduling Department are:

- Train Name
- Train Number
- Route (Departure – Arrival)
- Departure Time
- Arrival Time
- Departure Date
- Arrival Date
- Train Class
- Transit Point
- Train Ticket Price

Every day the Scheduling Department also monitors the scheduled route for any change of schedule and also the route price. If there is any change of schedule for the route, the Scheduling Department will inform the passenger who already book the route through e-mail and broadcast message using SMS.

### **Train Ticketing Process**

Passenger who wants to buy ticket of ESEMKA Train can visit one of ESEMKA Train branches and will be served by Operation Department in charge. The Operation Department then will inquire the detail of passenger route such **the origin of route, destination of the route, the date of departure**. Moreover, Operation Department will also ask **how many tickets** desired by the passenger for that route.

After receiving all the information, Operation Department will check the availability of route schedule that can be selected by the passenger by the date of route, also giving information of transit point (if any) and the duration of the route to the passenger. If the route schedule agreed by the passenger, the Operation Department will confirm the price applied to the route to the passenger and they will be asked to **provide details of the person**

**participating in the route** if they approve the price charged. These details include: **full name, identity number, and phone number.**

After providing details of the person participating in the route, the Operation Department will display the remaining empty seats for that route and passenger will be able choose the seats and coach class they prefers.

### **Passenger Boarding Process**

ESEMKA Train has check in counter in every entrance gate for passenger who will be having his/her travel. Passenger will be served by Passenger Boarding Department and is required to show his/her ticket and identity card, and after that, the Passenger Boarding Department will scan the ticket to input the ticket data to the system. Passenger Boarding Department will record that check in into check in form and direct the passenger into waiting room.

Every month, Operation Department will generate sales report for the tickets sold during that month, reviewing all the case study above, you're required to develop Information system to support all of the business process explained for ESEMKA Train. Ensure your developed solutions can accommodate ESEMKA Train business case properly.

From the ESEMKA Train studies above, you will act as a consultant to develop computerized information system to support the business process of ESEMKA Train.

The development will be conducted in 4 phases:

### **Phase 1: UML and Database Design**

A good information system always comes from a good system design, in this development phase you are required to design the information system including the database to support the ESEMKA Train business process above using several UML tools required:

#### **1. Use-Case Diagram**

- a. Ensure all the key function of the system is illustrated in the diagram
- b. Ensure all the actors relate to their corresponding function in the system
- c. Identify the include, extends or depends relationship of the system function on the diagram
- d. Ensure all the component used to illustrate the diagram is using the appropriate component

#### **2. Entity Relationship Diagram**

- a. Ensure the ERD developed can store all the information required in the system
- b. Ensure the relationship between the entities in the diagram is connected properly.
- c. Identify all the primary key and the foreign key

- d. Ensure all the component used to illustrate the diagram is using the appropriate component

### **3. Physical Model of the Database**

- a. Ensure all the entity in ERD is translated into a database object
- b. Ensure all the relation between the translated database object is connected properly
- c. Ensure all the constraint is implemented to support the system

From the ESEMKA Train studies above, you will act as a consultant to develop computerized information system to support the business process of ESEMKA Train.

The development will be conducted in 4 phases:

### **Phase 2: User Interface design**

From the information system design developed in the previous phase, you are required to develop the user interface of the system with the following criteria:

1. Ensure all the user interface developed, is concerning the 8 Golden Rules of User Interface Design
2. Clear and neat layout or component positioning is a key points to be concerned when developing the user interface
3. Ensure all the information fields on the user interface are using the proper component. E.g. using a radio button for gender fields.

From the ESEMKA Train studies above, you will act as a consultant to develop computerized information system to support the business process of ESEMKA Train.

The development will be conducted in 4 phases:

### **Phase 3: Application Development**

On the third phase of the information system development project, you have to finalize your design and implement all the business logic function of the system.

Please take notes to these following criteria when developing your application:

1. Ensure all the transaction processing function of the application is running properly.
2. Utilize the database developed on the first development phase when developing your application.
3. Develop all validation needed in the application.



From the ESEMKA Train studies above, you will act as a consultant to develop computerized information system to support the business process of ESEMKA Train and present the developed information system to your client

#### **Phase 4: Application Presentation and Demonstration**

On the last phase of the information system development project, you have to conduct presentation and application demonstration to your clients, showing all jobs that you already done. Please take notes to these following criteria to prepare your presentation:

1. Opening of Presentation should be clear and focused on what you going to present
2. Presentation content should be clear, precise, and detailed, to explain the function of information system developed
3. Application demonstration should able to solve sample business case
4. Communication skills, showing good presentation technique and conducted in Bahasa
5. Time management, you only given 15 minutes to present and demonstrate your application

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***Kisi - Kisi***

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## 1. TECHNICAL/COMPETITION DESCRIPTION (TD)

This competition is designed to test specialist users of software applications. The skill involves the ability to:

- Analyze system using data modeling tools and techniques (e.g. Class Diagram, Entity Relationship Diagram)
- Analyze system using function and activity modeling tools and techniques (e.g. Use Case Diagram, Sequence Diagram )
- Use investigation and learning skills to obtain user requirements (e.g., document search and analysis)
- Write a method given the desired behavior (inputs, outputs, pre-conditions and post-conditions).
- Use latest available integrated development environments and identify the strengths and weaknesses of each in software development
- Search for, evaluate and integrate appropriate libraries and frameworks into the software being developed
- Construct database structure
- Use the functionality of the .NET and / or Java environment to develop the software solution according to requirements specifications
- Use the full potential of SQL Server to store and manage the data for the system to be developed
- Demonstrating the software solution developed to solve sample of business case given
- Presenting the software solution developed in front of the clients to give functional overview of the software.

Generally, those skills are divided into four major groups of skill test:

<b>Group</b>	<b>Software</b>
UML and Database Design	Visio 2013 , Server Management Studio 2013 and SQL server 2013
User Interface Design	Microsoft Visual Studio Express Edition 2012 / Netbeans 7.4
Application Development	Microsoft Visual Studio Express Edition 2012 / Netbeans 7.4 and SQL Server Management Studio 2013
Application Presentation and Demonstration	Microsoft Office PowerPoint 2013

## **2. DETAIL COMPETITION MATERIAL**

Detail material of each group will be explained in this section.

### **2.1 UML and database design**

- Use Case Diagram
  - Key function of the system illustrated in diagram
  - all actor is connected properly with the activity
  - using the type of relationship properly
  - using appropriate component
- Entity Relationship Diagram
  - Able to identify PK and FK
  - relationship between entity connected properly
  - all information needed are stored
  - using appropriate component
- Physical Model of the database
  - all entity is translated into database object
  - defined the relationship between the entity
  - all the constraint implemented to support the system

### **2.2 User Interface design**

- 8 Golden Rules
  - Strive for consistency
  - Enable frequent users to use shortcuts
  - Offer informative feedback
  - Design dialog to yield closure
  - Offer simple error handling
  - Permit easy reversal of actions
  - Support internal locus of control
  - Reduce short-term memory load
- use case translated into application form
- all information is provided in the form field
- clean and neat layout
- use appropriate component

### **2.3 Application Development**

- all form developed can support the business process flow
- database query + connection
  - connection with the database is connected properly
  - query to display data
  - query to insert data
  - query to update data
  - query to delete data
  - query to search data

- database operation (insert, update, delete, search, select) use the proper field
- using the previous design database
- minimum 10 validations are created

## 2.4 Application Presentation and Demonstration

- opening of the presentation
- presentation content
- application demonstration using sample business case
- communication skills
- time management

## 3. COMPETITION SCENARIO

### 3.1 Opening Day

- ◆ **Welcome Ceremony**
- ◆ **Technical Briefing**
  1. Explanation of Competition rules
  2. Explanation of technical description
  3. Marking Schema
  4. Competitor working place's arrangement
- ◆ **Familiarization**
  1. Hardware PC Client & PC SERVER checking
  2. Software checking
  3. Competition working place checking

### 3.2 Competition Day 1

No	Schedule	Activity
1.	09:00 – 09.15	Case Explanation
2.	09:15 – 12:15	UML and database design
3.	12:15 – 13:15	Break and Submission
4.	13:15 – 13:30	Case Explanation
5.	13:30 – 16:00	User Interface design

### 3.3 Competition Day 2

No	Schedule	Activity
1.	08:00 – 08.15	Case Explanation
2.	08:15 – 12:15	Application Development
3.	12:15 – 13:15	Break and Submission
4.	13:15 – 15:15	Presentation Preparation

### 3.4 Competition Day 3

No	Schedule	Activity
1.	08:00 – 08.30	Presentation Preparation
2.	08:30 – 12:00	Application Presentation and Demonstration – Part 1
3.	12:00 – 13:00	Lunch
4.	13:00 – 17:00	Application Presentation and Demonstration – Part 2

## 4. MARKING GUIDELINE

- Marking will be done after each module finished
- Competitor that is capable to finish current module before submission time is not permitted to start doing the next module.
- Competitors are not allowed to revise the submitted module after the submission time.
- Competitors are not allowed to bring any electronic and printed material to competition area.
- Jury is checking based on given check list. One checklist may contain more than one marking components. Missing or incorrect result on one of those components will be assumed as wrong answer.
- Marking Percentage :
  - Designing information system including the database : 25%
  - Designing User Interface of the system : 25%
  - Developing System : 35%
  - Application Presentation and Demonstration : 15%

## 5. FACILITIES

### 5.1 Hardware

The following machines and equipment will be made available to each competitor:

- Computer for each competitor:
  - Motherboard core i3 + Driver, Min 2 GHz
  - LAN Card, VGA Card min 512 MB
  - Network capabilities of 100Mbps
  - Keyboard, Mouse USB
  - Hard disk min 80 GB 7200 RPM
  - Memory minimal 4 GB
  - Monitor LCD minimal 17”
- File Server
- CD/DVD Writer
- Blank DVD-RW
- UPS 10 KW
- Document holder and stationary

## **5.2 Software**

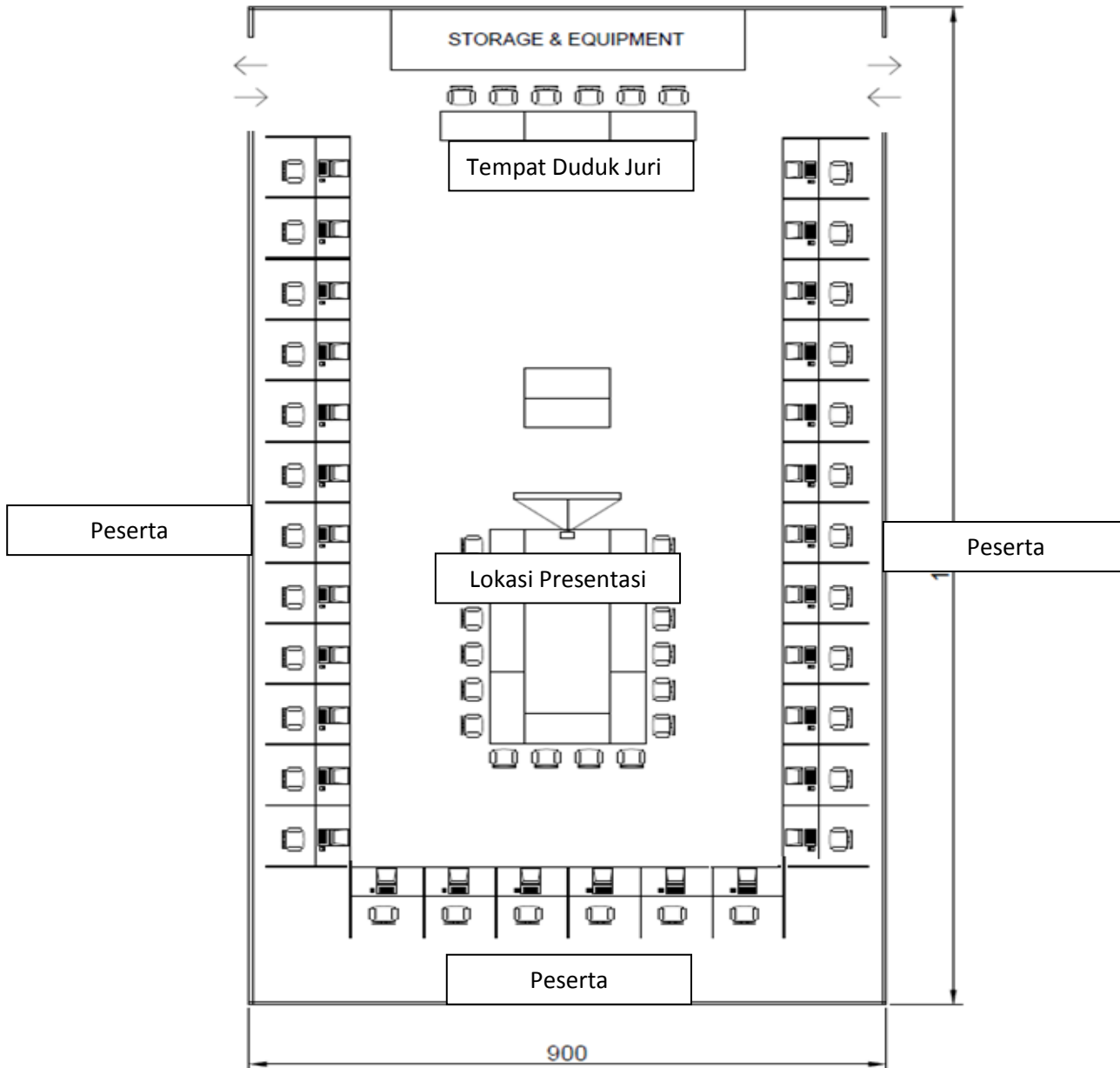
The software used by competitors will be representative of widely accepted International software and may represent several software producers. One important aspect will be the integration potential between the various types of software. This will require a careful check but software of the following kind will be required for each computer system:

- Visual Studio Express Edition 2012
- Netbeans 7.4
- JDK 2
- Microsoft Office Professional 2013
- Microsoft SQL Server Express Edition 2012
- Microsoft SQL Server Management Studio Express 2012
- Microsoft Visio Standard 2013
- PDF Reader
- .(dot) net framework 3.5 and 4.0

# LAYOUT RUANGAN LOMBA INFORMATION TECHNOLOGY / SOFTWARE APPLICATION LKS XXIII – 2015



**LKS SMK**  
Tingkat Nasional XXIII  
Serpong, 07-13 Juni 2015



Penyusun 1

Serpong, 11 Maret 2015  
Penyusun 2

Mahenda Metta Surya

Dawam Dwi Jatmiko Suwawi



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**Tahun 2015**



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**Lembar Informasi**

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## **I. Pendahuluan**

Era globalisasi memberi dampak ganda yaitu di samping membuka kesempatan kerjasama yang seluas-luasnya antar negara, juga membuka persaingan yang semakin ketat dan tajam di segala bidang pekerjaan.

Untuk menghadapi tantangan tersebut di atas, maka Pemerintah Indonesia harus memperkuat daya saing dan keunggulan kompetitif di semua sektor dengan mengandalkan pada kualitas dan kemampuan sumber daya manusia dengan penguasaan teknologi dan manajemen. Untuk itu Pemerintah selalu berusaha menyiapkan tenaga kerja yang berkompeten dalam bidangnya masing-masing.

Penyelenggaraan Lomba Keterampilan Siswa (LKS) Tingkat Nasional ke-XXIII di Serpong bagi siswa Sekolah Menengah Kejuruan (SMK) seluruh Indonesia adalah sebagai wujud nyata salah satu upaya dalam pengembangan sumber daya manusia yang dilakukan oleh Pemerintah melalui Direktorat Pembinaan SMK-Ditjen Pendidikan Menengah.

## **II. Tujuan**

1. Mendorong SMK untuk meningkatkan kualitas pelaksanaan Kegiatan Belajar Mengajar (KBM) yang mengacu kepada Standar Keterampilan Kerja Nasional Indonesia (SKKNI) bidang keahlian komputer khususnya penggunaan aplikasi software office automation dengan lebih mahir.
2. Untuk memantau peta kualitas dan kemampuan SMK di seluruh Indonesia sesuai dengan Standar Keterampilan Kerja Nasional Indonesia (SKKNI) bidang keahlian komputer khususnya penggunaan aplikasi software office automation.
3. Mempromosikan Keterampilan siswa SMK bidang keahlian komputer khususnya penggunaan aplikasi software office automation kepada dunia industri sebagai calon pengguna tenaga kerja.
4. Memberikan kesempatan dan motivasi kepada siswa untuk berkompetisi secara positif, untuk menumbuhkan kebanggaan pada bidang keahlian yang ditekuninya, juga kebanggaan bagi sekolah dan daerah/provinsinya.

## **III. Peserta**

Peserta adalah siswa SMK dengan kriteria sebagai berikut :

1. Warga Negara Kesatuan Republik Indonesia.
2. Tercatat Siswa Aktif SMK negeri atau Swasta program keahlian TI di Indonesia dalam tahun pelajaran 2014/2015.
3. Dinyatakan sebagai Pemenang LKS Tingkat Propinsi program keahlian TI – Software Application atau yang ditunjuk oleh Kepala Dinas Pendidikan Nasional di Propinsi sebagai peserta LKS tingkat Nasional ke-XXIII Tahun 2015 mewakili propinsi yang bersangkutan.
4. Setiap propinsi hanya dapat diwakili oleh 1 (satu) orang peserta.

## IV. Materi Lomba

### A. Lingkup Lomba

Jenis kegiatan yang dilombakan adalah meliputi :

1. UML and Database Design  
Meliputi tes keterampilan dalam merancang sistem informasi dengan menggunakan UML tools pada Microsoft Visio 2013 dan merancang database dengan menggunakan SQL Server 2012 (180 menit)
2. User Interface Design  
Meliputi tes keterampilan dalam merancangan user interface dari aplikasi yang dapat memenuhi kebutuhan informasi dari permintaan soal dengan menggunakan .net application (C# atau Visual Basic.net) atau java application (150 menit)
3. Application Development  
Meliputi tes keterampilan dalam mengembangkan aplikasi sesuai dengan perancangan sistem informasi maupun user interface yang telah dibuat dengan menggunakan .net application (C# atau Visual Basic.net) atau java application (240 menit)
4. Application Presentation and Demonstration  
Meliputi tes keterampilan dalam mempresentasikan hasil sistem informasi yang telah dikembangkan dengan memberikan simulasi bagaimana sistem informasi tersebut dapat memenuhi kebutuhan bisnis dari soal yang diberikan. Simulasi dilakukan dalam bentuk demo aplikasi dan presentasi hasil karya yang dikembangkan menggunakan Microsoft Office Powerpoint 2013 (450 menit)

### B. Skor dan Bobot Penilaian

*Skor maksimal dan bobot :*

1. UML and Database Design  
(skor maksimal 100, bobot 25%)..... N1
2. User Interface Design  
(skor maksimal 100, bobot 25%)..... N2
3. Application Development  
(skor maksimal 100, bobot 35%) ..... N3
4. Application Presentation and Demonstration  
(skor maksimal 100, bobot 15%)..... N4

Perhitungan Nilai Tes N1....N4 :

$$\text{Nilai Tes N1...N4} = \frac{\text{Skor Perolehan}}{\text{Skor maksimal}} \times \text{Bobot.}$$

$$\text{Nilai Akhir} = \sum(\text{Nilai Tes N1...N4})$$

### **C. Aspek-aspek Penilaian**

Ad.1. Aspek yang dinilai untuk Tes UML and Database Design adalah :

- Use Case Diagram
- Entity Relationship Diagram (ERD)
- Database Definition Language (DDL)

Ad.2. Aspek yang dinilai untuk Tes User Interface Design adalah:

- 8 Golden Rules of user interface design
- Layout
- Form component

Ad.3. Aspek yang dinilai untuk Tes Application Development adalah :

- Function
- Validation
- Form Interaction
- Database Manipulation Language (DML)
- Transaction Processing

Ad.4. Aspek yang dinilai untuk Tes Application Presentation and Demonstration adalah :

- Presentation Content
- Application Demonstration
- Time Management
- Communication Skills

### **V. Tim Penguji**

Tim Juri terdiri dari 3 orang professional/praktisi/akademisi di bidang IT Software Application khususnya dalam perancangan dan pengembangan aplikasi.

### **VI. Kriteria Pemenang Lomba**

Juara Lomba adalah peserta yang memiliki nilai akhir tertinggi dari seluruh nilai para peserta lomba. Nilai akan dibuat dalam distribusi normal untuk setiap modul dan hasil akhirnya akan di jumlahkan.

Para Juara ditentukan langsung oleh Juri meliputi: Juara I, II dan III, serta Juara Harapan I, II, dan III

### **VII. Tempat Lomba**

Lomba akan dilaksanakan di Serpong, Banten

## VIII. Tata Tertib Lomba

Pembimbing diharapkan :

1. Mendampingi peserta pada saat 'technical meeting'.
2. Mengisi daftar hadir yang disediakan Panitia.
3. Menjaga ketertiban dan ketenangan dalam pelaksanaan lomba.
4. Membantu peserta yang dibimbingnya apabila terjadi gangguan kesehatan.
5. Tidak membantu peserta pada saat lomba berlangsung.

Peserta diharapkan :

- a. Hanya satu orang yang menjadi peserta mewakili propinsi dengan Surat Penunjukkan dari Dinas Pendidikan Propinsi. Tidak dibenarkan peserta diganti di saat tengah lomba berlangsung.
- b. Peserta harus hadir pada saat 'technical meeting'.
- c. Peserta harus sudah hadir 15 menit sebelum test dimulai.
- d. Wajib mengisi daftar hadir pada saat setiap jenis lomba yang diadakan.
- e. Berpakaian kerja yang rapi, diharapkan hanya memakai identitas nomor peserta dari panitya.
- f. Tidak diperbolehkan membawa buku/catatan/HP di ruang ujian.
- g. Untuk alasan kesehatan peserta diperbolehkan membawa makanan kecil dan minuman ke dalam ruang ujian.
- h. Penentuan nomor peserta dilakukan melalui undian, bagi peserta yang tidak mengikuti technical meeting, nomor undian ditentukan oleh panitia.
- i. Peserta lomba menempati/menggunakan peralatan lomba sesuai hasil undi.
- j. Peserta tidak dapat melanjutkan lomba dikarenakan sakit atau hal-hal lain, maka dianggap gugur/ mengundurkan diri.
- k. Peserta tidak dibenarkan berkonsultasi atau mendapat pengarahan teknis tentang pekerjaan (job) pada waktu kegiatan berlangsung dari pembimbing masing-masing kecuali dari tim juri.
- l. Kegagalan/ keterlambatan pekerjaan tidak diberikan toleransi (misalnya karena lupa pekerjaan belum di-save).
- m. Peserta lomba wajib melakukan pemeriksaan peralatan dan kebersihan lingkungan kerja.
- n. Pemeriksaan peralatan dilakukan oleh peserta di depan juri dan panitia selama lebih kurang 120 menit sebelum perlombaan dimulai.
- o. Kerusakan peralatan (hardware/software) akibat kesalahan prosedur yang dilakukan peserta, menjadi tanggung jawab peserta itu sendiri.
- p. Tidak dibenarkan menggunakan peralatan (hardware/software) diluar ketentuan yang ada.

- q. Pembimbing tidak dibenarkan masuk ke ruang lomba atau menghubungi peserta baik langsung maupun alat komunikasi pada saat lomba berlangsung dengan alasan apapun. Mematuhi tata tertib yang telah ditentukan oleh panitia atau juri, apabila melanggar maka akan dikenakan sanksi.

## **IX. Penutup**

Hal-hal yang belum tercantum dalam lembar informasi ini akan diinformasikan pada waktu rapat teknis (technical meeting).