

## LAMPIRAN

### a. Source Code Halaman Login

```

<?php
// page_login.php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utils.php";

// Pastikan session aktif (kalau auth.php belum start session)
if (session_status() === PHP_SESSION_NONE) {
    session_start();
}

if (!empty($_SESSION['user'])) { header("Location:
page_dashboard.php"); exit; }

$err = flash_get('err');
$ok = flash_get('ok');
?>
<?php require_once "includes/header.php"; ?>
<div class="loginWrap">
    <div class="loginCard">
        <div class="loginLeft">
            <div style="display:flex;align-items:center;gap:12px">
                
                <div>
                    <div class="note" style="font-weight:800">SMA SEMEN
GRESIK</div>
                    <div class="h1" style="margin:0">Welcome</div>
                </div>
            </div>

            <?php if($err): ?><div class="alert err" style="margin-
top:12px"><?=h($err)?></div><?php endif; ?>
            <?php if($ok): ?><div class="alert ok" style="margin-
top:12px"><?=h($ok)?></div><?php endif; ?>

            <form class="loginForm" method="POST"
action="backend_login.php">
                <input class="input" name="username" placeholder="Email
/ Username" required>

```

```

        <input class="input" type="password" name="password"
placeholder="Password" required>

        <!-- FIX sesuai permintaan: default akun admin /
smasg2025 -->
        <div class="note" style="margin:6px 2px 2px">
            Default: <b>admin</b> / <b>smasg2025</b>
        </div>

        <button class="btn primary" type="submit"
style="width:180px;margin-top:6px">SIGN IN</button>

        <!-- Tetap dipertahankan (tidak dihapus), hanya teks
dibuat aman -->
        <a class="note" href="installer.php" style="margin-
top:6px;display:inline-block">
            Jika DB belum ter-import, jalankan installer/import
data.
        </a>
    </form>
</div>

<div class="loginRight">
    <div style="display:flex;gap:10px;align-items:center">
        <div style="width:12px;height:12px;border-
radius:999px;background:rgba(255,255,255,.65)"></div>
        <div style="width:12px;height:12px;border-
radius:999px;background:rgba(255,255,255,.35)"></div>
        <div style="width:12px;height:12px;border-
radius:999px;background:rgba(255,255,255,.2)"></div>
    </div>

    <div style="font-size:34px;font-weight:900;line-
height:1.1">Sistem Klasifikasi<br>Prestasi Siswa</div>
    <div class="loginSub">Dashboard • Input Nilai • KNN •
Laporan</div>
    <div style="margin-top:14px;font-
size:13px;color:rgba(255,255,255,.85)">
        Palet warna mengikuti logo (tosca + putih + abu muda).
    </div>
</div>
</div>
</div>
<?php require_once "includes/footer.php"; ?>

```

## b. Source Code Halaman Dashboard

```

<?php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utils.php";
require_login();

$ACTIVE="dashboard";
require_once "includes/header.php";

$total_siswa = (int)($conn->query("SELECT COUNT(*) c FROM
siswa")->fetch_assoc()['c'] ?? 0);
$total_nilai = (int)($conn->query("SELECT COUNT(*) c FROM
nilai_siswa")->fetch_assoc()['c'] ?? 0);
$total_hasil = (int)($conn->query("SELECT COUNT(*) c FROM
hasil_klasifikasi")->fetch_assoc()['c'] ?? 0);

$dist = ['Baik'=>0, 'Cukup'=>0, 'Kurang'=>0];
$res = $conn->query("SELECT hasil, COUNT(*) c FROM
hasil_klasifikasi GROUP BY hasil");
while($r=$res->fetch_assoc()){ $dist[$r['hasil']] =
(int)$r['c']; }

$latest = $conn->query("
SELECT hk.created_at, hk.hasil, hk.knn_k, s.nisn, s.nama,
s.kelas, s.jurusan
FROM hasil_klasifikasi hk
JOIN siswa s ON s.id=hk.siswa_id
ORDER BY hk.id DESC
LIMIT 10
");
?>
<div class="container">
  <div class="layout">
    <?php require_once "includes/sidebar.php"; ?>

    <div class="content">
      <div class="card">
        <div class="topRow">
          <div>
            <div class="h1">Dashboard User</div>
            <div class="note">Ringkasan data dan distribusi
hasil klasifikasi.</div>
          </div>
        </div>
      </div>
    </div>
  </div>
</div>

```

```

        <div style="display:flex;gap:8px;flex-wrap:wrap">
            <a class="btn"
href="page_input_data_siswa.php">Input Siswa</a>
            <a class="btn" href="page_input_nilai.php">Input
Nilai</a>
            <a class="btn primary"
href="page_klasifikasi_knn.php">Mulai Proses Klasifikasi</a>
            <a class="btn" href="page_laporan.php">Lihat
Laporan</a>
        </div>
    </div>

    <div class="sep"></div>

    <div class="grid3">
        <div class="kpi"><div class="k">Jumlah Siswa</div><div
class="v"><?=$total_siswa?></div></div>
        <div class="kpi"><div class="k">Jumlah Nilai</div><div
class="v"><?=$total_nilai?></div></div>
        <div class="kpi"><div class="k">Jumlah
Klasifikasi</div><div class="v"><?=$total_hasil?></div></div>
    </div>

    <div class="card">
        <div class="topRow">
            <div>
                <div class="h1" style="font-size:16px">Grafik
Distribusi Hasil</div>
                <div class="note">Sumber: tabel
<b>hasil_klasifikasi</b>.</div>
            </div>
            <span class="badge">Update: <?=date('d-m-Y H:i')?>
WIB</span>
        </div>

        <div class="twoCols" style="margin-top:12px">
            <div class="chartBox">
                <div class="small"><b>Grafik Batang</b></div>
                <canvas id="barChart" height="160"></canvas>
            </div>
            <div class="chartBox">
                <div class="small"><b>Grafik Lingkaran</b></div>
                <canvas id="pieChart" height="160"></canvas>
            </div>
        </div>
    </div>

```

```

        </div>
    </div>

    <div class="card">
        <div class="topRow">
            <div>
                <div class="h1" style="font-size:16px">Aktivitas
Terbaru</div>
                <div class="note">10 hasil klasifikasi
terakhir.</div>
            </div>
            <a class="btn small" href="page_laporan.php">Buka
Laporan</a>
        </div>
        <div class="sep"></div>

        <div class="tableWrap">
            <table class="table" style="min-width:760px">
                <thead>
                    <tr><th>WAKTU</th><th>NISN</th><th>NAMA</th><th>KE
LAS/JURUSAN</th><th>K</th><th>HASIL</th></tr>
                </thead>
                <tbody>
                    <?php while($r=$latest->fetch_assoc()): ?>
                        <tr>
                            <td><?=h($r['created_at'])?></td>
                            <td><?=h($r['nisn'])?></td>
                            <td><?=h($r['nama'])?></td>
                            <td><?=h($r['kelas']. " /
".$r['jurusan'])?></td>
                            <td><?=h($r['knn_k'])?></td>
                            <td><span class="badge
<?=strtolower($r['hasil'])?>"><?=h($r['hasil'])?></span></td>
                        </tr>
                    <?php endwhile; ?>
                </tbody>
            </table>
        </div>
    </div>
</div>
</div>
</div>
<script>

```

```

(function(){
  const labels = ["Baik","Cukup","Kurang"];
  const values = [<?=(int)$dist['Baik'] ?>, <?=(int)$dist['Cukup'] ?>, <?=(int)$dist['Kurang'] ?>];

  new Chart(document.getElementById('barChart'), {
    type: 'bar',
    data: { labels, datasets: [{ label:'Jumlah', data: values }]
  },
  options: { responsive:true, plugins:{legend:{display:false}}
}
});

  new Chart(document.getElementById('pieChart'), {
    type: 'doughnut',
    data: { labels, datasets: [{ data: values }] },
    options: { responsive:true }
  });
})();
</script>
<?php require_once "includes/footer.php"; ?>

```

c. Source Code Halaman Data Siswa

```

<?php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utills.php";
require_login();

$ACTIVE="siswa";
require_once "includes/header.php";

$q = trim($_GET['q'] ?? '');
if ($q !== '') {
  $qq = "%".$q."%";
  $stmt = $conn->prepare("SELECT * FROM siswa WHERE nispn LIKE ?
OR nama LIKE ? ORDER BY id DESC LIMIT 300");
  $stmt->bind_param("ss", $qq, $qq);
  $stmt->execute();
  $rows = $stmt->get_result();
} else {
  $rows = $conn->query("SELECT * FROM siswa ORDER BY id DESC
LIMIT 300");

```

```

}

$err = flash_get('err');
$ok  = flash_get('ok');
?>
<div class="container">
  <div class="layout">
    <?php require_once "includes/sidebar.php"; ?>
    <div class="content">

      <div class="card">
        <div class="topRow">
          <div>
            <div class="h1">Data Siswa</div>
            <div class="note">Cari cepat (ketik NISN atau nama)
agar tidak perlu scroll panjang.</div>
          </div>

          <!-- tombol input: cukup dari halaman ini -->
          <div style="display:flex;gap:8px;flex-wrap:wrap">
            <a class="btn" href="page_input_data_siswa.php">+
Input Siswa</a>
            <a class="btn primary" href="page_input_nilai.php">+
Input Nilai</a>
          </div>
        </div>

        <?php if($err): ?><div class="alert err" style="margin-
top:12px"><?=h($err)?></div><?php endif; ?>
        <?php if($ok): ?><div class="alert ok" style="margin-
top:12px"><?=h($ok)?></div><?php endif; ?>

        <div class="sep"></div>

        <form method="GET" style="display:flex;gap:10px;align-
items:center;flex-wrap:wrap">
          <input class="input" name="q" value="<?=h($q)?>"
placeholder="Cari NISN / Nama..." style="max-width:420px">
          <button class="btn primary"
type="submit">Cari</button>
          <a class="btn" href="page_data_siswa.php">Reset</a>
        </form>
      </div>

      <div class="card">

```

```

<div class="tableWrap">
  <table class="table">
    <thead>
      <tr>
        <th>NO.</th><th>NISN</th><th>NAMA</th><th>KELAS<
/th><th>JURUSAN</th><th>JK</th><th>STATUS</th><th>AKSI</th>
      </tr>
    </thead>
    <tbody>
      <?php $no=1; while($r=$rows->fetch_assoc()): ?>
        <?php
          $jk = isset($r['jenis_kelamin']) &&
$r['jenis_kelamin'] != ' ' ? $r['jenis_kelamin'] : '-';
          $st = isset($r['status']) && $r['status'] !=
' ' ? $r['status'] : '-';
        ?>
        <tr>
          <td><?=$no++?></td>
          <td><?=h($r['nisn'])?></td>
          <td><?=h($r['nama'])?></td>
          <td><?=h($r['kelas'])?></td>
          <td><?=h($r['jurusan'])?></td>
          <td><?=h($jk)?></td>
          <td><span
class="badge"><?=h($st)?></span></td>
          <td style="white-space:nowrap">
            <a class="btn small"
href="page_input_data_siswa.php?id=<?=$r['id']?>">Edit</a>
            <a class="btn small danger"
href="backend_siswa_delete.php?id=<?=$r['id']?>" onclick="return
confirm('Hapus siswa ini?')">Hapus</a>
          </td>
        </tr>
      <?php endwhile; ?>
      <?php if($rows->num_rows === 0): ?>
        <tr><td colspan="8" class="note">Data tidak
ditemukan.</td></tr>
      <?php endif; ?>
    </tbody>
  </table>
</div>
</div>
</div>
</div>

```

```

</div>
<?php require_once "includes/footer.php"; ?>

```

#### d. Source Code Halaman Input Data Siswa

```

<?php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utils.php";
require_login();

$ACTIVE="siswa_form";
require_once "includes/header.php";

$id = (int)($_GET['id'] ?? 0);
$row = null;
if ($id) {
    $stmt = $conn->prepare("SELECT * FROM siswa WHERE id=? LIMIT
1");
    $stmt->bind_param("i", $id);
    $stmt->execute();
    $row = $stmt->get_result()->fetch_assoc();
}

$err = flash_get('err');
$ok = flash_get('ok');
?>
<div class="container">
    <div class="layout">
        <?php require_once "includes/sidebar.php"; ?>
        <div class="content">

            <div class="card">
                <div class="topRow">
                    <div>
                        <div class="h1">Input Data Siswa</div>
                        <div class="note">Tambah / edit data siswa. NISN
harus unik.</div>
                    </div>
                    <a class="btn" href="page_data_siswa.php">Kembali</a>
                </div>
            </div>
        </div>
    </div>

```

```

        <?php if($err): ?><div class="alert err" style="margin-top:12px"><?=h($err)?></div><?php endif; ?>
        <?php if($ok): ?><div class="alert ok" style="margin-top:12px"><?=h($ok)?></div><?php endif; ?>

        <div class="sep"></div>

        <form method="POST" action="backend_siswa_save.php" id="siswaForm">
            <input type="hidden" name="id" value="<?=$id?>">
            <div class="formRow">
                <div class="note"><b>NIS/NISN</b></div>
                <input class="input" name="nisn" value="<?=h($row['nisn'] ?? '')?>" required>
            </div>
            <div class="formRow">
                <div class="note"><b>Nama</b></div>
                <input class="input" name="nama" value="<?=h($row['nama'] ?? '')?>" required>
            </div>
            <div class="formRow">
                <div class="note"><b>Kelas</b></div>
                <input class="input" name="kelas" value="<?=h($row['kelas'] ?? 'XII')?>" required>
            </div>
            <div class="formRow">
                <div class="note"><b>Jurusan</b></div>
                <input class="input" name="jurusan" value="<?=h($row['jurusan'] ?? 'IPA')?>">
            </div>
            <div class="formRow">
                <div class="note"><b>Jenis Kelamin</b></div>
                <select name="jenis_kelamin" required>
                    <?php $jk = $row['jenis_kelamin'] ?? 'L'; ?>
                    <option value="L" <?=$jk==='L'? 'selected': ''?>>Laki-laki</option>
                    <option value="P" <?=$jk==='P'? 'selected': ''?>>Perempuan</option>
                </select>
            </div>
            <div class="formRow">
                <div class="note"><b>Alamat</b></div>
                <textarea class="input" name="alamat" rows="2"><?=h($row['alamat'] ?? '')?></textarea>
            </div>

```

```

        <div class="formRow">
            <div class="note"><b>No. HP</b> <small
style="color:#666">(hanya angka)</small></div>
            <input class="input" name="no_hp"
value="<?=h($row['no_hp'] ?? ' ')?>" pattern="[0-9]*"
title="Hanya angka yang diperbolehkan">
        </div>
        <div class="formRow">
            <div class="note"><b>Status</b> <small
style="color:#666">(nonaktif tidak akan diproses)</small></div>
            <select name="status" required>
                <?php $st = $row['status'] ?? 'aktif'; ?>
                <option value="aktif"
<?=$st==='aktif'? 'selected': ''?>>Aktif</option>
                <option value="nonaktif"
<?=$st==='nonaktif'? 'selected': ''?>>Nonaktif</option>
            </select>
        </div>

        <div style="display:flex;gap:10px;justify-
content:flex-end;margin-top:14px;flex-wrap:wrap">
            <a class="btn"
href="page_data_siswa.php">Kembali</a>
            <button class="btn primary"
type="submit">Simpan</button>
            <button class="btn" type="reset">Reset</button>
        </div>
    </form>
</div>

</div>
</div>
</div>

<script>
document.getElementById('siswaForm').addEventListener('submit',
function(e) {
    const nohp = this.querySelector('input[name="no_hp"]');
    if (nohp.value && !/^\d+$/ .test(nohp.value)) {
        alert('Nomor HP hanya boleh mengandung angka');
        nohp.focus();
        e.preventDefault();
        return false;
    }
    return true;
});

```

```
});
</script>

<?php require_once "includes/footer.php"; ?>
```

e. Source Code Halaman Data Nilai

```
<?php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utills.php";
require_login();

$ACTIVE="nilai";
require_once "includes/header.php";

$q = trim($_GET['q'] ?? '');
if ($q !== '') {
    $qq = "%".$q."%";
    $stmt = $conn->prepare("
        SELECT n.*, s.nisn, s.nama, s.kelas, s.jurusan
        FROM nilai_siswa n
        JOIN siswa s ON s.id=n.siswa_id
        WHERE s.nisn LIKE ? OR s.nama LIKE ?
        ORDER BY n.id DESC LIMIT 300
    ");
    $stmt->bind_param("ss", $qq, $qq);
    $stmt->execute();
    $rows = $stmt->get_result();
} else {
    $rows = $conn->query("
        SELECT n.*, s.nisn, s.nama, s.kelas, s.jurusan
        FROM nilai_siswa n
        JOIN siswa s ON s.id=n.siswa_id
        ORDER BY n.id DESC LIMIT 300
    ");
}

$err = flash_get('err');
$ok = flash_get('ok');
?>
<div class="container">
    <div class="layout">
```

```

<?php require_once "includes/sidebar.php"; ?>
<div class="content">

    <div class="card">
        <div class="topRow">
            <div>
                <div class="h1">Data Nilai Siswa</div>
                <div class="note">Cari cepat (ketik NISN atau
nama).</div>
            </div>
            <div style="display:flex;gap:8px;flex-wrap:wrap">
                <a class="btn" href="page_input_nilai.php">+ Input
Nilai</a>
                <a class="btn primary"
href="page_klasifikasi_knn.php">Proses KNN</a>
            </div>
        </div>

        <?php if($err): ?><div class="alert err" style="margin-
top:12px"><?=h($err)?></div><?php endif; ?>
        <?php if($ok): ?><div class="alert ok" style="margin-
top:12px"><?=h($ok)?></div><?php endif; ?>

        <div class="sep"></div>
        <form method="GET" style="display:flex;gap:10px;align-
items:center;flex-wrap:wrap">
            <input class="input" name="q" value="<?=h($q)?>"
placeholder="Cari NISN / Nama..." style="max-width:420px">
            <button class="btn primary"
type="submit">Cari</button>
            <a class="btn" href="page_data_nilai.php">Reset</a>
        </form>
    </div>

    <div class="card">
        <div class="tableWrap">
            <table class="table">
                <thead>
                    <tr>
                        <th>NO.</th><th>NISN</th><th>NAMA</th><th>KELAS/
JURUSAN</th>
                        <th>RAPOR</th><th>KEHADIRAN</th><th>EKSKUL</th><
th>KELAS ASLI</th><th>WAKTU</th><th>AKSI</th>
                    </tr>
                </thead>

```

```

  <?php $no=1; while($r=$rows->fetch_assoc()): ?>
    <tr>
      <td><?=$no++?></td>
      <td><?=h($r['nisn'])?></td>
      <td><?=h($r['nama'])?></td>
      <td><?=h(($r['kelas'] ?? '')." /
".($r['jurusan'] ?? ''))?></td>
      <td><?=h($r['rapor'])?></td>
      <td><?=h($r['kehadiran'])?></td>
      <td><?=h($r['ekskul'])?></td>
      <td>
        <?= $r['kelas_asli']
        ? '<span class="badge
'.strtolower($r['kelas_asli']).'">'.h($r['kelas_asli']).'</span>
'
        : '<span class="badge">-</span>' ?>
      </td>
      <td><?=h($r['created_at'])?></td>
      <td style="white-space:nowrap">
        <a class="btn small"
href="page_input_nilai.php?id=<?=$r['id']?>">Edit</a>
        <a class="btn small danger"
href="backend_nilai_delete.php?id=<?=$r['id']?>" onclick="return
confirm('Hapus nilai ini?')">Hapus</a>
      </td>
    </tr>
  <?php endwhile; ?>
  <?php if($rows->num_rows === 0): ?>
    <tr><td colspan="10" class="note">Data tidak
ditemukan.</td></tr>
  <?php endif; ?>
</tbody>
</table>
</div>
</div>
</div>
<?php require_once "includes/footer.php"; ?>

```

## f. Source Code Halaman Input Data Nilai

```

<?php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utils.php";
require_login();

$ACTIVE="nilai";
require_once "includes/header.php";

// Ambil semua siswa aktif untuk dropdown
$siswaOpt = [];
$r = $conn->query("SELECT id, nisn, nama FROM siswa WHERE
status='aktif' ORDER BY nama");
while($x=$r->fetch_assoc()) $siswaOpt[$x['id']] = $x['nisn']." -
".$x['nama'];

// Edit mode
$id = (int)($_GET['id'] ?? 0);
$row = null;
if ($id) {
    $stmt = $conn->prepare("SELECT ns.*, s.nisn FROM nilai_siswa
ns JOIN siswa s ON s.id=ns.siswa_id WHERE ns.id=?");
    $stmt->bind_param("i", $id);
    $stmt->execute();
    $row = $stmt->get_result()->fetch_assoc();
}

// Dataset default untuk data baru
$dataset_default = 'uji';

$err = flash_get('err');
$ok = flash_get('ok');
?>
<div class="container">
    <div class="layout">
        <?php require_once "includes/sidebar.php"; ?>
        <div class="content">

            <div class="card">
                <div class="topRow">
                    <div>
                        <div class="h1">Input Data Nilai Siswa</div>

```

```

        <div class="note">Tambah/edit nilai siswa. Data baru
default masuk ke <b>Data Uji</b>.</div>
    </div>
    <a class="btn" href="page_data_nilai.php">Kembali</a>
</div>

<?php if($err): ?><div class="alert err" style="margin-
top:12px"><?=h($err)?></div><?php endif; ?>
<?php if($ok): ?><div class="alert ok" style="margin-
top:12px"><?=h($ok)?></div><?php endif; ?>

<div class="sep"></div>

<form method="POST" action="backend_nilai_save.php">
    <input type="hidden" name="id" value="<?=$id?>">

    <div class="formRow">
        <div class="note"><b>Siswa</b> <small
style="color:#666">(hanya yang aktif)</small></div>
        <select name="siswa_id" required>
            <option value="">-- Pilih Siswa --</option>
            <?php foreach($siswaOpt as $sid=>$label):
                $selected = ($row && $row['siswa_id']==$sid) ?
'selected' : '';
                ?>
                <option value="<?=$sid?>"
<?=$selected?>><?=h($label)?></option>
            <?php endforeach; ?>
        </select>
    </div>

    <div class="threeCols">
        <div class="formRow">
            <div class="note"><b>Nilai Rapor</b> (0-100)</div>
            <input class="input" type="number" step="0.01"
min="0" max="100" name="rapor"
                value="<?=h($row['rapor'] ?? '')?>"
required>
        </div>
        <div class="formRow">
            <div class="note"><b>Kehadiran</b> (0-100%)</div>
            <input class="input" type="number" step="0.01"
min="0" max="100" name="kehadiran"
                value="<?=h($row['kehadiran'] ?? '')?>"
required>

```

```

        </div>
        <div class="formRow">
            <div class="note"><b>Nilai Ekskul</b> (0-
100)</div>
            <input class="input" type="number" step="0.01"
min="0" max="100" name="ekskul"
            value="<?=h($row['ekskul'] ?? '')?>"
required>
        </div>
    </div>

    <div class="formRow">
        <div class="note"><b>Kelas Asli</b> <small
style="color:#666">(jika diketahui)</small></div>
        <select name="kelas_asli">
            <option value="">-- Pilih (opsional) --</option>
            <option value="Baik"
<?=( $row['kelas_asli']??'')=='Baik'? 'selected':''?>>Baik</option
            >
                <option value="Cukup"
<?=( $row['kelas_asli']??'')=='Cukup'? 'selected':''?>>Cukup</opti
on>
                <option value="Kurang"
<?=( $row['kelas_asli']??'')=='Kurang'? 'selected':''?>>Kurang</op
tion>
            </select>
        </div>

        <?php if(!$id): // Hanya untuk data baru ?>
        <div class="formRow">
            <div class="note"><b>Simpan ke Dataset</b></div>
            <div style="display:flex; gap:20px; margin-
top:5px;">
                <label style="display:flex; align-items:center;
gap:6px;">
                    <input type="radio" name="dataset" value="uji"
<?=$dataset_default=='uji'? 'checked':''?>>
                    <span>Data Uji (default)</span>
                </label>
                <label style="display:flex; align-items:center;
gap:6px;">
                    <input type="radio" name="dataset" value="latih"
<?=$dataset_default=='latih'? 'checked':''?>>
                    <span>Data Latih</span>
                </label>

```

```

        </div>
        <small style="color:#666; display:block; margin-
top:5px;">
            Data Uji: untuk klasifikasi data baru<br>
            Data Latih: untuk melatih model KNN
        </small>
    </div>
<?php endif; ?>

    <div style="display:flex;gap:10px;justify-
content:flex-end;margin-top:14px;flex-wrap:wrap">
        <a class="btn"
href="page_data_nilai.php">Kembali</a>
        <button class="btn primary"
type="submit">Simpan</button>
        <button class="btn" type="reset">Reset</button>
    </div>
</form>
</div>

</div>
</div>
</div>
<?php require_once "includes/footer.php"; ?>

```

g. Source Code Halaman Proses Klasifikasi

```

<?php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utils.php";
require_once "lib/metrics.php";
require_login();

// SET WIB - PERBAIKAN WAKTU
date_default_timezone_set('Asia/Jakarta');

$ACTIVE="knn";
require_once "includes/header.php";

mysqli_report(MYSQLI_REPORT_ERROR | MYSQLI_REPORT_STRICT);
$conn->set_charset("utf8mb4");

```

```

// =====
// LABELS HARUS DI ATAS!
// =====
$labels = ['Baik', 'Cukup', 'Kurang'];

// K hanya 3,5,7,9
$K_ALLOWED = [3,5,7,9];

// K aktif
$k = (int)($_GET['k'] ?? 3);
if (!in_array($k, $K_ALLOWED, true)) $k = 3;

$kelasFilter = trim($_GET['kelas'] ?? '');
$jurusanFilter = trim($_GET['jurusan'] ?? '');

// Hitung jumlah data latih dan uji REAL dari database -
PERBAIKAN: hanya data valid
$count_latih = $conn->query("SELECT COUNT(*) as c FROM
data_latih WHERE rapor IS NOT NULL AND kehadiran IS NOT NULL AND
ekskul IS NOT NULL")->fetch_assoc()['c'];
$count_uji = $conn->query("SELECT COUNT(*) as c FROM data_uji
WHERE rapor IS NOT NULL AND kehadiran IS NOT NULL AND ekskul IS
NOT NULL")->fetch_assoc()['c'];

// Dropdown options
$kelasOpt = [];
$r = $conn->query("SELECT DISTINCT kelas FROM siswa WHERE
status='aktif' ORDER BY kelas");
if ($r) while($x=$r->fetch_assoc()) $kelasOpt[] = $x['kelas'];

$jurusanOpt = [];
$r = $conn->query("SELECT DISTINCT jurusan FROM siswa WHERE
status='aktif' ORDER BY jurusan");
if ($r) while($x=$r->fetch_assoc()) $jurusanOpt[] =
$x['jurusan'];

// flash
$flashOk = flash_get('ok');
$flashErr = flash_get('err');

// =====
// RINGKASAN METRIK SEMUA K - REAL DATA
// =====
$allMetrics = [];
foreach($K_ALLOWED as $kk){

```

```

// Ambil data REAL dari knn_expected dan data_uji
$sql = "
SELECT du.kelas_asli AS y_true, ke.pred AS y_pred
FROM data_uji du
JOIN knn_expected ke ON ke.nisn = du.nisn AND ke.knn_k = ?
WHERE du.kelas_asli IS NOT NULL AND du.kelas_asli != ''
AND ke.pred IS NOT NULL AND ke.pred != ''
ORDER BY du.urut ASC
";
$st = $conn->prepare($sql);
$st->bind_param("i", $kk);
$st->execute();
$rs = $st->get_result();

$yT=[]; $yP=[];
while($rr=$rs->fetch_assoc()){
    $yT[] = (string)$rr['y_true'];
    $yP[] = (string)$rr['y_pred'];
}

// Hitung metrics dengan data REAL
if (count($yT) > 0 && count($yP) > 0) {
    $allMetrics[$kk] = metrics_from_arrays($yT,$yP,$labels);
} else {
    // Jika tidak ada data REAL, kosongkan saja
    $allMetrics[$kk] = [
        'report' => [
            'accuracy' => 0,
            'per_class' => [],
            'macro_avg' => [
                'precision' => 0,
                'recall' => 0,
                'f1' => 0,
                'support' => 0
            ],
            'weighted_avg' => [
                'precision' => 0,
                'recall' => 0,
                'f1' => 0,
                'support' => 0
            ]
        ],
    ];
}
}

```

```

// =====
// AMBIL SEMUA HASIL KLASIFIKASI (DATA LAMA + BARU)
// =====
$where = "WHERE hk.knn_k=?";
$params = [$k];
$types = "i";

if ($kelasFilter !== '') { $where.=" AND
s.kelas=?"; $params[]=$kelasFilter; $types.="s"; }
if ($jurusanFilter !== '') { $where.=" AND s.jurusan=?";
$params[]=$jurusanFilter; $types.="s"; }

$stmt = $conn->prepare("
    SELECT hk.*, s.nisn, s.kelas, s.jurusan,
           n.rapor, n.kehadiran, n.ekskul, n.kelas_asli
    FROM hasil_klasifikasi hk
    JOIN siswa s ON s.id=hk.siswa_id
    JOIN nilai_siswa n ON n.id=hk.nilai_id
    $where
    ORDER BY hk.id ASC
    LIMIT 3000
");
$stmt->bind_param($types, ...$params);
$stmt->execute();
$hasil = $stmt->get_result();

$dist = ['Baik'=>0, 'Cukup'=>0, 'Kurang'=>0];
$hasilRows = [];
while($row=$hasil->fetch_assoc()){
    $hasilRows[] = $row;
    if (isset($dist[$row['hasil']])) $dist[$row['hasil']]++;
}

// evaluasi (yang punya kelas_asli) REAL
$evalRows = array_values(array_filter($hasilRows,
fn($r)=>($r['kelas_asli'] ?? '') !== ''));

// confusion matrix + report untuk K aktif - REAL DATA
$cm = confusion_matrix_init($labels);
foreach($evalRows as $r){
    $a = (string)$r['kelas_asli'];
    $p = (string)$r['hasil'];
    if (isset($cm[$a][$p])) $cm[$a][$p] += 1;
}

```

```

$report = classification_report($cm, $labels);

// Hitung jumlah data REAL untuk tampilan
$totalEvaluasi = count($evalRows);
$totalHasil = count($hasilRows);
?>
<div class="container">
  <div class="layout">
    <?php require_once "includes/sidebar.php"; ?>
    <div class="content">

      <div class="card">
        <div class="topRow">
          <div>
            <div class="h1">Klasifikasi K-Nearest Neighbor</div>
            <div class="note">K hanya tersedia: <b>3, 5, 7,
9</b>. Klik <b>Proses KNN</b> untuk menyimpan hasil, lalu
<b>Download PDF</b>.</div>
          </div>
          <a class="btn"
            href="backend_knn_download.php?k=<?=$k?>&kelas=<?=u
rlencode($kelasFilter)?>&jurusan=<?=urlencode($jurusanFilter)?>"
            target="_blank" rel="noopener">Download PDF</a>
          </div>

          <?php if($flashOk): ?>
            <div class="alert ok" style="margin-
top:12px"><?=$flashOk?></div>
          <?php endif; ?>
          <?php if($flashErr): ?>
            <div class="alert err" style="margin-
top:12px"><?=h($flashErr)?></div>
          <?php endif; ?>

          <!-- Info Data REAL - PERBAIKAN KETERANGAN -->
          <div style="margin-top:10px; padding:12px;
background:#f8f9fa; border-radius:4px; border-left:4px solid
#2196F3;">
            <div style="display:flex; gap:15px; flex-wrap:wrap;
font-size:14px;">
              <div><b>Data Latih :</b> <?=$count_latih?>
record (untuk training)</div>
              <div><b>Data Uji :</b> <?=$count_uji?> record
(semua data termasuk import)</div>

```

```

        <div><b>Hasil Klasifikasi:</b> <?=$totalHasil?>
data (lama + baru)</div>
        <div><b>Data Evaluasi:</b> <?=$totalEvaluasi?>
data (dengan kelas asli)</div>
        <div style="color:#666; font-weight:bold;">
            <i>Data realtime: <?=date('d-m-Y H:i:s')?>
WIB</i>
        </div>
    </div>
    <div style="margin-top:8px; font-size:12px;
color:#666;">
        <b>Keterangan:</b> Proses KNN akan
mengklasifikasi semua data (34 data lama + data import baru).
    </div>
</div>

<div class="sep"></div>

<form method="GET" style="display:flex;gap:10px;align-
items:center;flex-wrap:wrap">
    <div class="note"><b>Pilih K</b></div>
    <select name="k" class="input" style="width:140px">
        <?php foreach($K_ALLOWED as $kk): ?>
            <option value="<?=$kk?>"
<?=$kk===<?=$k?'selected':'?'>>K = <?=$kk?></option>
        <?php endforeach; ?>
    </select>

    <div class="note"><b>Kelas</b></div>
    <select name="kelas" class="input"
style="width:150px">
        <option value="">Semua</option>
        <?php foreach($kelasOpt as $x): ?>
            <option value="<?=h($x)?>"
<?=$x===<?=$kelasFilter?'selected':'?'>><?=h($x)?></option>
        <?php endforeach; ?>
    </select>

    <div class="note"><b>Jurusan</b></div>
    <select name="jurusan" class="input"
style="width:150px">
        <option value="">Semua</option>
        <?php foreach($jurusanOpt as $x): ?>
            <option value="<?=h($x)?>"
<?=$x===<?=$jurusanFilter?'selected':'?'>><?=h($x)?></option>

```

```

        <?php endforeach; ?>
    </select>

    <button class="btn" type="submit">Tampilkan</button>

    <a class="btn primary"
        href="backend_knn_process.php?k=<?=$k?>&kelas=<?=urlencode($kelasFilter)?>&jurusan=<?=urlencode($jurusanFilter)?>"
        onclick="return confirm('Proses KNN untuk
K=<?=$k?>? Semua data (lama+baru) akan diproses.');">
        Proses KNN
    </a>

    <a class="btn" href="page_import_excel.php">Import
Excel</a>
</form>
</div>

<div class="card">
    <div class="topRow">
        <div>
            <div class="h1" style="font-size:16px">Ringkasan
Hasil </div>
            <div class="note">K = <b><?=$k?></b> | Total hasil:
<b><?=$totalHasil?></b> (semua data) | Evaluasi:
<b><?=$totalEvaluasi?></b></div>
            </div>
            <span class="badge"
style="background:#2196F3;">Realtime: <?=date('d-m-Y H:i:s')?>
WIB</span>
            </div>

        <div class="sep"></div>

        <div class="h1" style="font-size:14px">Ringkasan Metrik
Semua K (3,5,7,9) - SEMUA DATA</div>
        <div class="tableWrap" style="overflow-x:auto;">
            <table class="table" style="min-width:820px">
                <thead>
                    <tr>
                        <th>K</th><th>Accuracy</th>
                        <th>Macro Precision</th><th>Macro
Recall</th><th>Macro F1</th>
                        <th>Weighted Precision</th><th>Weighted
Recall</th><th>Weighted F1</th>

```

```

        </tr>
    </thead>
    <tbody>
        <?php foreach($K_ALLOWED as $kk):
            $rep = $allMetrics[$kk]['report'];
            $accuracy = isset($rep['accuracy']) ?
$rep['accuracy'] * 100 : 0;
            $macroPrecision =
isset($rep['macro_avg']['precision']) ?
$rep['macro_avg']['precision'] : 0;
            $macroRecall =
isset($rep['macro_avg']['recall']) ? $rep['macro_avg']['recall']
: 0;
            $macroF1 = isset($rep['macro_avg']['f1']) ?
$rep['macro_avg']['f1'] : 0;
            $weightedPrecision =
isset($rep['weighted_avg']['precision']) ?
$rep['weighted_avg']['precision'] : 0;
            $weightedRecall =
isset($rep['weighted_avg']['recall']) ?
$rep['weighted_avg']['recall'] : 0;
            $weightedF1 = isset($rep['weighted_avg']['f1'])
? $rep['weighted_avg']['f1'] : 0;
        ?>
        <tr
    <?=$kk=== $k?' style="background:#E8F5E9;":"" : ''?>>
            <td><b><?=$kk?></b></td>
            <td><?=number_format($accuracy, 2)?>%</td>
            <td><?=number_format($macroPrecision, 2)?></td>
            <td><?=number_format($macroRecall, 2)?></td>
            <td><?=number_format($macroF1, 2)?></td>
            <td><?=number_format($weightedPrecision,
2)?></td>
            <td><?=number_format($weightedRecall, 2)?></td>
            <td><?=number_format($weightedF1, 2)?></td>
        </tr>
        <?php endforeach; ?>
    </tbody>
</table>
</div>

<div class="sep"></div>

<div class="twoCols">
    <div>

```

```

<div class="note" style="font-weight:800;margin-
bottom:6px">Tabel Hasil (Semua Data - Lama + Baru)</div>
<div class="tableWrap" style="overflow-x:auto;">
  <table class="table" style="min-width:860px">
    <thead>
      <tr>
        <th>No</th><th>NISN</th><th>Kelas/Jurusan</t
h>
        <th>Rapor</th><th>Kehadiran</th><th>Ekskul</
th>
        <th>Kelas Asli</th>
        <th>Prediksi (K=<?=$k?>)</th>
      </tr>
    </thead>
    <tbody>
      <?php $no=1; foreach($hasilRows as $r): ?>
        <tr>
          <td><?=$no++?></td>
          <td><?=h($r['nispn'])?></td>
          <td><?=h(($r['kelas']??'-')." /
".($r['jurusan']??'-'))?></td>
          <td><?=h($r['rapor'])?></td>
          <td><?=h($r['kehadiran'])?></td>
          <td><?=h($r['ekskul'])?></td>
          <td>
            <?php if($r['kelas_asli']): ?>
              <span class="badge
<?=strtolower($r['kelas_asli'])?>">
                <?=h($r['kelas_asli'])?>
              </span>
            <?php else: ?>
              <span class="badge"
style="background:#9E9E9E;">-</span>
            <?php endif; ?>
          </td>
          <td>
            <span class="badge
<?=strtolower($r['hasil'])?>">
              <?=h($r['hasil'])?>
            </span>
          </td>
        </tr>
      <?php endforeach; ?>
      <?php if(count($hasilRows)===0): ?>
        <tr>

```

```

                <td colspan="8" class="note" style="text-align:center; padding:20px;">
                    Belum ada hasil. Klik <b>Proses KNN</b>
                    untuk memulai klasifikasi.
                </td>
            </tr>
        </tbody>
    </table>
</div>
</div>

<div class="chartBox">
    <div class="small"><b>Grafik Distribusi Prediksi
</b></div>
    <canvas id="distChart" height="220"></canvas>
    <div class="sep"></div>
    <div class="small"><b>Akurasi (berdasarkan data
evaluasi)</b></div>
    <div style="font-size:32px;font-weight:900;margin-top:6px">
        <?php if ($totalEvaluasi > 0): ?>
            <?=number_format($report['accuracy'] * 100,
2)?>%
        <?php else: ?>
            0.00%
        <?php endif: ?>
    </div>
    <div class="small">
        <?php if ($totalEvaluasi > 0): ?>
            Data evaluasi : <?=$totalEvaluasi?> records
        <?php else: ?>
            Belum ada data evaluasi (tidak ada kelas asli)
        <?php endif: ?>
    </div>
    <div style="margin-top:10px; padding:8px;
background:#f5f5f5; border-radius:4px; font-size:12px;">
        <b>Distribusi:</b> Baik: <?=$dist['Baik']?> |
Cukup: <?=$dist['Cukup']?> | Kurang: <?=$dist['Kurang']?>
    </div>
</div>
</div>

    <div class="sep"></div>

```

```

<div class="twoCols">
  <div>
    <div class="h1" style="font-size:14px">Classification Report </div>
    <?php if ($totalEvaluasi > 0): ?>
      <div class="tableWrap" style="overflow-x:auto;">
        <table class="table" style="min-width:620px">
          <thead><tr><th>KELAS</th><th>PRECISION</th><th>RECALL</th><th>F1-SCORE</th><th>SUPPORT</th></tr></thead>
          <tbody>
            <?php foreach($labels as $lab):
              $precision =
isset($report['per_class'][$lab]['precision']) ?
$report['per_class'][$lab]['precision'] : 0;
              $recall =
isset($report['per_class'][$lab]['recall']) ?
$report['per_class'][$lab]['recall'] : 0;
              $f1 =
isset($report['per_class'][$lab]['f1']) ?
$report['per_class'][$lab]['f1'] : 0;
              $support =
isset($report['per_class'][$lab]['support']) ?
$report['per_class'][$lab]['support'] : 0;
            ?>
            <tr>
              <td><?h($lab)?></td>
              <td><?=number_format($precision, 2)?></td>
              <td><?=number_format($recall, 2)?></td>
              <td><?=number_format($f1, 2)?></td>
              <td><?=h($support)?></td>
            </tr>
            <?php endforeach; ?>
            <tr>
              <td><b>accuracy</b></td>
              <td colspan="3"><b><?=number_format($report['accuracy'], 2)?></b></td>
              <td><?=h($totalEvaluasi)?></td>
            </tr>
            <tr>
              <td>macro avg</td>
              <td><?=number_format($report['macro_avg']['precision'], 2)?></td>
              <td><?=number_format($report['macro_avg']['recall'], 2)?></td>

```



```

        $bgColor = $isDiagonal ? '#E8F5E9' :
'#FFEB3B';
        $textColor = $isDiagonal ? '#2E7D32' :
'#C62828';
        echo '<span style="padding:8px 12px;
margin:2px; background:'. $bgColor. '; color:'. $textColor. ';
border-radius:4px; min-width:40px;">'. $value. '</span>';
        endforeach;
        echo '</div>';
    endforeach;
    ?>
</div>
</div>

<div class="tableWrap" style="overflow-x:auto;">
    <table class="table" style="min-width:520px">
        <thead>
            <tr>
                <th style="min-width:140px">ACTUAL \
                PRED</th>
                <?php foreach($labels as $p): ?><th
style="min-width:110px"><?=h($p)?></th><?php endforeach; ?>
            </tr>
        </thead>
        <tbody>
            <?php foreach($labels as $a): ?>
                <tr>
                    <th><?=h($a)?></th>
                    <?php foreach($labels as $p):
                        $value = isset($cm[$a][$p]) ?
$cm[$a][$p] : 0;
                    ?>
                    <td style="text-align:center;"><?= $value
?></td>
                <?php endforeach; ?>
            </tr>
        </tbody>
    </table>
</div>
<?php else: ?>
    <div class="note">Tidak ada confusion matrix
karena tidak ada data evaluasi.</div>
<?php endif; ?>
</div>

```

```

        </div>

    </div>

</div>
</div>
</div>

<script
src="https://cdn.jsdelivr.net/npm/chart.js@4.4.1/dist/chart.umd.
min.js"></script>
<script>
(function(){
    const labels = ["Baik","Cukup","Kurang"];
    const values = [<?=(int)$dist['Baik'] ?>, <?=(
int)$dist['Cukup'] ?>, <?=(int)$dist['Kurang'] ?>];

    new Chart(document.getElementById('distChart'), {
        type: 'doughnut',
        data: {
            labels,
            datasets: [{
                data: values,
                backgroundColor: [
                    'rgba(75, 192, 192, 0.7)',
                    'rgba(255, 206, 86, 0.7)',
                    'rgba(255, 99, 132, 0.7)'
                ],
                borderColor: [
                    'rgb(75, 192, 192)',
                    'rgb(255, 206, 86)',
                    'rgb(255, 99, 132)'
                ],
                borderWidth: 1
            }]
        },
        options: {
            responsive: true,
            plugins: {
                legend: {
                    position: 'bottom',
                    labels: {
                        padding: 20,
                        usePointStyle: true,
                    }
                }
            }
        }
    });
}());

```

```

    },
    tooltip: {
      callbacks: {
        label: function(context) {
          let label = context.label || '';
          if (label) {
            label += ': ';
          }
          const value = context.raw;
          const total = context.dataset.data.reduce((a, b)
=> a + b, 0);
          const percentage = Math.round((value / total) *
100);
          label += value + ' data (' + percentage + '%)';
          return label;
        }
      }
    }
  }
});
})();
</script>

<?php require_once "includes/footer.php"; ?>

```

#### h. Source Code Halaman Laporan

```

<?php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utils.php";
require_once "lib/knn.php";
require_login();

$ACTIVE="laporan";
require_once "includes/header.php";

mysqli_report(MYSQLI_REPORT_ERROR | MYSQLI_REPORT_STRICT);
$conn->set_charset("utf8mb4");

// =====
// settings table opsional

```

```

// =====
$k_default = 3;
$folds = 5;

$hasSettings = false;
try {
    $chk = $conn->query("SHOW TABLES LIKE 'settings'");
    $hasSettings = ($chk && $chk->num_rows > 0);
} catch (Throwable $e) {
    $hasSettings = false;
}

if ($hasSettings) {
    try {
        $set = $conn->query("SELECT knn_k, cv_folds FROM settings
WHERE id=1")->fetch_assoc();
        $k_default = (int)($set['knn_k'] ?? 3);
        $folds = (int)($set['cv_folds'] ?? 5);
    } catch (Throwable $e) {
        $k_default = 3;
        $folds = 5;
    }
}

// =====
// K hanya 3,5,7,9
// =====
$k_list = [3,5,7,9];
$k = (int)($_GET['k'] ?? $k_default);
if (!in_array($k, $k_list, true)) $k = 3;

$kelasFilter = trim($_GET['kelas'] ?? '');
$jurusanFilter = trim($_GET['jurusan'] ?? '');

// dropdown kelas/jurusan
$kelasOpt = [];
$r = $conn->query("SELECT DISTINCT kelas FROM siswa ORDER BY
kelas");
if ($r) while($x=$r->fetch_assoc()) $kelasOpt[] = $x['kelas'];

$jurusanOpt = [];
$r = $conn->query("SELECT DISTINCT jurusan FROM siswa ORDER BY
jurusan");
if ($r) while($x=$r->fetch_assoc()) $jurusanOpt[] =
$x['jurusan'];

```

```

// =====
// Ambil hasil klasifikasi REAL
// =====
$where = "WHERE hk.knn_k=?";
$params = [$k];
$types = "i";

if ($kelasFilter !== '') { $where.=" AND
s.kelas=?"; $params[]=$kelasFilter; $types.="s"; }
if ($jurusanFilter !== '') { $where.=" AND s.jurusan=?";
$params[]=$jurusanFilter; $types.="s"; }

$stmt = $conn->prepare("
    SELECT hk.*, s.nisn, s.nama, s.kelas, s.jurusan,
           n.rapor, n.kehadiran, n.ekskul, n.kelas_asli
    FROM hasil_klasifikasi hk
    JOIN siswa s ON s.id=hk.siswa_id
    JOIN nilai_siswa n ON n.id=hk.nilai_id
    $where
    ORDER BY hk.id ASC
    LIMIT 1500
");
$stmt->bind_param($types, ...$params);
$stmt->execute();
$res = $stmt->get_result();

$rows = [];
$dist = ['Baik'=>0, 'Cukup'=>0, 'Kurang'=>0];
$last_at = null;

while($r=$res->fetch_assoc()){
    $rows[] = $r;
    if (isset($dist[$r['hasil']])) $dist[$r['hasil']]++;
    if (isset($r['created_at']) && (!$last_at || $r['created_at']
> $last_at)) $last_at = $r['created_at'];
}
$total = count($rows);

// =====
// TAMPILKAN jumlah data_latih & data_uji REAL
// =====
$cntLatih = 0;
$cntUji = 0;
try {

```

```

    $cntLatih = (int)($conn->query("SELECT COUNT(*) c FROM
data_latih")->fetch_assoc()['c'] ?? 0);
    $cntUji   = (int)($conn->query("SELECT COUNT(*) c FROM
data_uji")->fetch_assoc()['c'] ?? 0);
} catch (Throwable $e) {
    $cntLatih = 0;
    $cntUji   = 0;
}

// =====
// Cross Validation (opsional) - REAL DATA
// =====
$cv = [];
$bestK = null;
$bestAcc = -1;

$cvEnabled = function_exists('cross_validate_knn');

if ($cvEnabled) {
    $train = [];
    try {
        // Ambil data latih REAL
        $r = $conn->query("SELECT rapor, kehadiran, ekskul,
kelas_asli FROM data_latih ORDER BY urutan ASC");
        if ($r) while($x=$r->fetch_assoc()){
            $train[] = [
                'rapor'      => (float)$x['rapor'],
                'kehadiran' => (float)$x['kehadiran'],
                'ekskul'    => (float)$x['ekskul'],
                'kelas_asli' => (string)$x['kelas_asli'],
            ];
        }
    } catch (Throwable $e) {
        $train = [];
    }

    if (count($train) > 0) {
        foreach($k_list as $kk){
            $cvRes = cross_validate_knn($train, $kk, $folds, 42);
            $acc = (float)($cvRes['avg_accuracy'] ?? 0);
            $cv[] = ['k'=>$kk, 'acc'=>$acc];
            if ($acc > $bestAcc) { $bestAcc = $acc; $bestK = $kk; }
        }
    }
}
}

```

```

?>
<div class="container">
  <div class="layout">
    <?php require_once "includes/sidebar.php"; ?>
    <div class="content">

      <div class="card">
        <div class="topRow">
          <div>
            <div class="h1">Laporan </div>
            <div class="note">Laporan berdasarkan data . Filter
berdasarkan K dan kelas/jurusan. Unduh hasil dalam PDF.</div>
          </div>
          <a class="btn"
            href="backend_knn_download.php?k=<?=$k?>&kelas=<?=u
rlencode($kelasFilter)?>&jurusan=<?=urlencode($jurusanFilter)?>"
            target="_blank" rel="noopener">Download</a>
          </div>

          <div class="sep"></div>

          <form method="GET" style="display:flex;gap:10px;align-
items:center;flex-wrap:wrap">
            <div class="note"><b>Pilih K</b></div>
            <select name="k" class="input" style="width:120px">
              <?php foreach($k_list as $opt): ?>
                <option value="<?=$opt?>"
<?=$opt==$k?'selected':'?'>>K = <?=$opt?></option>
              <?php endforeach; ?>
            </select>

            <div class="note"><b>Kelas/Jurusan</b></div>
            <select name="kelas" class="input"
style="width:150px">
              <option value="">Semua Kelas</option>
              <?php foreach($kelasOpt as $x): ?>
                <option value="<?=h($x)?>"
<?=$x===&#36;kelasFilter?'selected':'?'>><?=h($x)?></option>
              <?php endforeach; ?>
            </select>

            <select name="jurusan" class="input"
style="width:150px">
              <option value="">Semua Jurusan</option>
              <?php foreach($jurusanOpt as $x): ?>

```

```

        <option value="<?=h($x)?>"
<?=$x===$jurusanFilter?'selected':''?><?=h($x)?></option>
        <?php endforeach; ?>
    </select>

    <button class="btn primary" type="submit">Tampilkan
Laporan </button>
    </form>
</div>

<div class="card">
    <div class="topRow">
        <div>
            <div class="h1" style="font-size:16px">Ringkasan
Hasil </div>
            <div class="note">Total hasil: <b><?=$total?></b> |
K=<b><?=$k?></b> | Data Latih =<b><?=$cntLatih?></b> | Data Uji
=<b><?=$cntUji?></b></div>
            </div>
            <span class="badge">Realtime: <?=date('d-m-Y
H:i:s')?></span>
            </div>

        <div class="sep"></div>

        <div class="grid3" style="grid-template-
columns:repeat(6,minmax(0,1fr))">
            <div class="kpi"><div class="k">Total Hasil
(K=<?=$k?>)</div><div class="v"><?=$total?></div></div>
            <div class="kpi"><div class="k">Data Latih </div><div
class="v"><?=$cntLatih?></div></div>
            <div class="kpi"><div class="k">Data Uji </div><div
class="v"><?=$cntUji?></div></div>
            <div class="kpi"><div class="k">Prediksi
Baik</div><div class="v"><?=$dist['Baik']?></div></div>
            <div class="kpi"><div class="k">Prediksi
Cukup</div><div class="v"><?=$dist['Cukup']?></div></div>
            <div class="kpi"><div class="k">Prediksi
Kurang</div><div class="v"><?=$dist['Kurang']?></div></div>
            </div>

        <div class="sep"></div>

        <div class="twoCols">
            <div class="chartBox">

```

```

        <div class="small"><b>Grafik Batang </b></div>
        <canvas id="barChart" height="170"></canvas>
    </div>
    <div class="chartBox">
        <div class="small"><b>Grafik Lingkaran </b></div>
        <canvas id="pieChart" height="170"></canvas>
    </div>
</div>
</div>

<div class="card">
    <div class="topRow">
        <div>
            <div class="h1" style="font-size:16px">Hasil
Klasifikasi </div>
            <div class="note">Tabel hasil (maks 1500 baris).
Data realtime.</div>
        </div>
    </div>
    <div class="sep"></div>

    <div class="tableWrap" style="overflow-x:auto;">
        <table class="table" style="min-width:980px">
            <thead>
                <tr>
                    <th>NO.</th><th>NISN</th><th>NAMA</th><th>KELAS<
/th><th>JURUSAN</th>
                    <th>NILAI
RAPOR</th><th>KEHADIRAN</th><th>EKSTRA-
KURIKULER</th><th>KATEGORI</th>
                </tr>
            </thead>
            <tbody>
                <?php $no=1; foreach($rows as $r): ?>
                    <tr>
                        <td><?=$no++?></td>
                        <td><?=h($r['nisi'])?></td>
                        <td><?=h($r['nama'])?></td>
                        <td><?=h($r['kelas'])?></td>
                        <td><?=h($r['jurusan'])?></td>
                        <td><?=h($r['rapor'])?></td>
                        <td><?=h($r['kehadiran'])?></td>
                        <td><?=h($r['ekskul'])?></td>
                        <td><span class="badge
<?=strtolower($r['hasil'])?>"><?=h($r['hasil'])?></span></td>

```

```

        </tr>
        <?php endforeach; ?>
        <?php if($total===0): ?>
            <tr><td colspan="9" class="note">Belum ada
hasil untuk K=<?=$k?>. Silakan proses KNN dulu.</td></tr>
        <?php endif; ?>
    </tbody>
</table>
</div>

<div class="sep"></div>
<div class="note">
    Catatan: Laporan ini berdasarkan hasil klasifikasi
    K = <b><?=$k?></b>.
    Data diperbarui: <?=date('d-m-Y H:i:s')?>
</div>
</div>

<div class="card">
    <div class="topRow">
        <div>
            <div class="h1" style="font-size:16px">Cross
Validation </div>
            <?php if($cvEnabled && count($cv)>0): ?>
                <div class="note">K-Fold = <b><?=$folds?></b>. K
terbaik : <b><?=$bestK?></b> (akurasi rata-rata
<?=number_format($bestAcc*100,2)?>%).</div>
            <?php else: ?>
                <div class="note">Cross validation tidak
ditampilkan (fungsi belum tersedia / data_latih kosong).</div>
            <?php endif; ?>
        </div>
    </div>
<div class="sep"></div>

<?php if($cvEnabled && count($cv)>0): ?>
    <div class="tableWrap" style="overflow-x:auto;">
        <table class="table" style="min-width:520px">
            <thead><tr><th>K</th><th>Akurasi Rata-rata
</th></tr></thead>
            <tbody>
                <?php foreach($cv as $c): ?>
                    <tr>
                        <td><?=h($c['k'])?></td>

```

```

                <td><?=number_format($c['acc']*100,2)?>%</td>
            >
                </tr>
            <?php endforeach; ?>
        </tbody>
    </table>
</div>
<?php endif; ?>
</div>

</div>
</div>
</div>

<script
src="https://cdn.jsdelivr.net/npm/chart.js@4.4.1/dist/chart.umd.
min.js"></script>
<script>
(function(){
    const labels = ["Baik","Cukup","Kurang"];
    const values = [<?= (int)$dist['Baik'] ?>, <?=
(int)$dist['Cukup'] ?>, <?= (int)$dist['Kurang'] ?>];

    new Chart(document.getElementById('barChart'), {
        type: 'bar',
        data: { labels, datasets: [{ label:'Jumlah ', data: values
    ] } },
        options: { responsive:true, plugins:{legend:{display:false}}
    }
    });

    new Chart(document.getElementById('pieChart'), {
        type: 'doughnut',
        data: { labels, datasets: [{ data: values } ] },
        options: { responsive:true, plugins:{ legend:{
position:'bottom' } } }
    });
})();
</script>

<?php require_once "includes/footer.php"; ?>

```

## i. Source Code Halaman Pengaturan

```

<?php
require_once "config/db.php";
require_once "config/auth.php";
require_once "lib/utils.php";
require_login();

$ACTIVE="settings";
$u = current_user();
require_once "includes/header.php";

mysqli_report(MYSQLI_REPORT_ERROR | MYSQLI_REPORT_STRICT);
$conn->set_charset("utf8mb4");

$err = flash_get('err');
$ok  = flash_get('ok');

function col_exists(mysqli $conn, string $table, string $col):
bool {
    $sql = "SELECT COUNT(*) AS c
           FROM INFORMATION_SCHEMA.COLUMNS
           WHERE TABLE_SCHEMA = DATABASE() AND TABLE_NAME=? AND
COLUMN_NAME=?";
    $st = $conn->prepare($sql);
    $st->bind_param("ss", $table, $col);
    $st->execute();
    $row = $st->get_result()->fetch_assoc();
    return ((int)$row['c'] ?? 0) > 0;
}

$hasEmail = col_exists($conn,'users','email');
$hasRole  = col_exists($conn,'users','role');

$selectCols = "id, nama, username, created_at";
if ($hasEmail) $selectCols .= ", email";
if ($hasRole)  $selectCols .= ", role";

$stmt = $conn->prepare("SELECT {$selectCols} FROM users WHERE
id=? LIMIT 1");
$stmt->bind_param("i", $u['id']);
$stmt->execute();
$me = $stmt->get_result()->fetch_assoc();

```

```

$users = $conn->query("SELECT {$selectCols} FROM users ORDER BY
id DESC LIMIT 50");
?>
<div class="container">
  <div class="layout">
    <?php require_once "includes/sidebar.php"; ?>
    <div class="content">

      <div class="card">
        <div class="topRow">
          <div>
            <div class="h1">Informasi Akun dan Pengaturan</div>
            <div class="note">Kelola profil dan password. Admin
dapat menambah user.</div>
          </div>
        </div>

        <?php if($err): ?><div class="alert err" style="margin-
top:12px"><?=h($err)?></div><?php endif; ?>
        <?php if($ok): ?><div class="alert ok" style="margin-
top:12px"><?=h($ok)?></div><?php endif; ?>

        <div class="sep"></div>

        <div class="twoCols">
          <div class="card" style="box-shadow:none;border:1px
solid #e7edf1">
            <div class="topRow">
              <div>
                <div class="h1" style="font-
size:16px">Profil</div>
                <div class="note">Role:
                  <b><?=h($hasRole ? ($me['role'] ?? '-') : '-'
?)></b>
                </div>
              </div>
            </div>
            <div class="badge">Terakhir login:
<?=h($_SESSION['last_login_at'] ?? '-')?></div>
            </div>
          <div class="sep"></div>

          <form method="POST"
action="backend_user_update.php">

```

```

        <div class="formRow"><div
class="note"><b>Nama</b></div><input class="input" name="nama"
value="<?=h($me['nama'] ?? ' ')?>" required></div>
        <div class="formRow"><div
class="note"><b>Username</b></div><input class="input"
name="username" value="<?=h($me['username'] ?? ' ')?>"
required></div>

        <?php if($hasEmail): ?>
        <div class="formRow"><div
class="note"><b>Email</b></div><input class="input" name="email"
value="<?=h($me['email'] ?? ' ')?>"></div>
        <?php endif; ?>

        <button class="btn primary" type="submit">Edit
Profil</button>
        </form>
        </div>

        <div class="card" style="box-shadow:none;border:1px
solid #e7edf1">
        <div class="h1" style="font-size:16px">Ubah
Password</div>
        <div class="note">Gunakan password kuat.</div>
        <div class="sep"></div>

        <form method="POST"
action="backend_password_update.php">
        <input class="input" type="password"
name="old_password" placeholder="Password lama" required>
        <input class="input" type="password"
name="new_password" placeholder="Password baru" required
style="margin-top:10px">
        <button class="btn primary" type="submit"
style="margin-top:10px">Ubah Password</button>
        </form>
        </div>
</div>

<div class="sep"></div>

<div class="h1" style="font-size:16px">Manajemen
User</div>
<div class="note">Menampilkan 50 user terakhir.</div>

```

```

<div class="sep"></div>

<div class="twoCols">
  <div class="tableWrap">
    <table class="table" style="min-width:720px">
      <thead>
        <tr>
          <th>ID</th><th>NAMA</th><th>USERNAME</th>
          <?php if($hasEmail): ?><th>EMAIL</th><?php
endif; ?>
          <?php if($hasRole): ?><th>ROLE</th><?php
endif; ?>
          <th>AKSI</th>
        </tr>
      </thead>
      <tbody>
        <?php while($r=$users->fetch_assoc()): ?>
          <tr>
            <td><?h($r['id'])?></td>
            <td><?h($r['nama'])?></td>
            <td><?h($r['username'])?></td>
            <?php if($hasEmail): ?><td><?h($r['email']
?? ' ')?></td><?php endif; ?>
            <?php if($hasRole): ?><td><span
class="badge"><?h($r['role'] ?? '- ')?></span></td><?php endif;
?>
            <td>
              <?php if((int)$r['id'] !==
(int)$me['id']): ?>
                <a class="btn small danger"
href="backend_user_delete.php?id=<?=$r['id']?>" onclick="return
confirm('Hapus user ini?')">Hapus</a>
                <?php else: ?>
                  <span class="badge">Ini kamu</span>
                <?php endif; ?>
              </td>
            </tr>
          <?php endwhile; ?>
        </tbody>
      </table>
    </div>

    <div class="card" style="box-shadow:none;border:1px
solid #e7edf1">

```

