

How to be a smarter developer

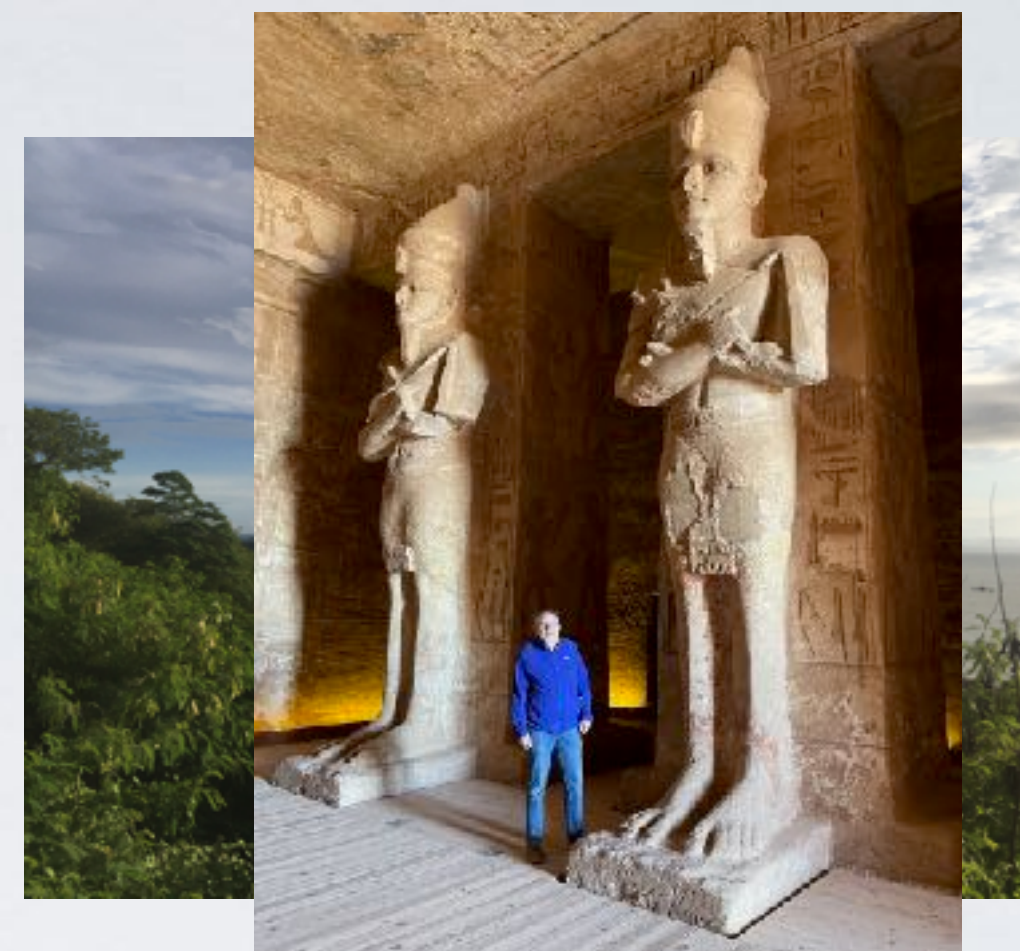


Leverage AI in DevOps

DICK DRAL, APEX MEETUP 04-09-2024

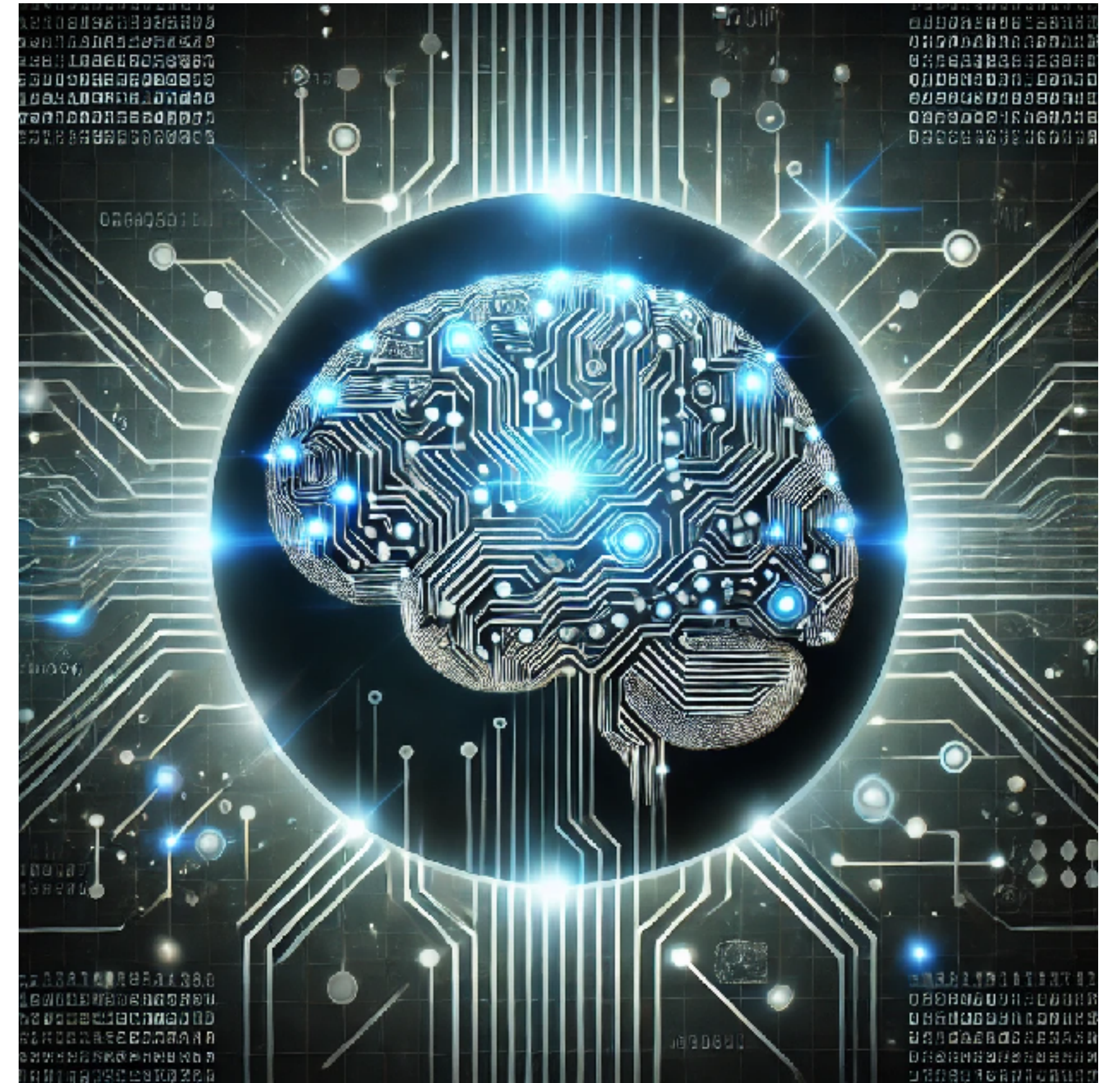
What will I be talking about

- AI in general, specifically LLM's
- experiences using ChatGPT + APEX AI assistant
- what help does AI provide (and what not)
- some thoughts about AI



Artificial Intelligence

- Symbolic AI
 - program based on rules
- Machine Learning
 - training on data, specific uses
- Deep Learning
 - Neural networks, multi layered
- Generative AI
 - LLM's, prediction on next word



Intelligent machines?

- can AI pass the Turing Test?



Can AI pass the Turing Test? 1/2

In an essay published in the 1950s, the mathematician and computer pioneer Alan Turing proposed the Turing test. It has become one of the most important milestones in the research and development of artificial intelligence.

The Turing test is the first step in determining whether a machine can detect human intelligence by engaging in a conversation with a human. The test examines whether humans can tell if they are talking to a machine or a human.

Not long ago, Google demonstrated the first time that a computer has entered into a natural conversation with a human, using the latest AI tech. The program, known as *Eugene Goostman*, is the first artificial intelligence to pass the test, originally developed by 20th-century mathematician



Share this article

For those who haven't clocked on yet, the above blog post was entirely generated by a machine, being both researched and written by an AI algorithm.

Source: wildfirepr.com/blog

Detecting humor?

why does time flies like an arrow and fruit flies like banana?



The phrase "Time flies like an arrow; fruit flies like a banana" is a well-known example of a garden path sentence, a sentence that initially seems to make sense but leads the reader to a different interpretation as it progresses.

- **First part:** "Time flies like an arrow" uses "flies" as a verb, meaning that time passes quickly, similar to how an arrow moves fast.
- **Second part:** "Fruit flies like a banana" plays with the structure of the sentence. Here, "flies" is not a verb but a noun referring to the insect, and "like" means "enjoy" or "are attracted to." So, it means that fruit flies (the insect) are attracted to bananas.

The humor comes from the dual meaning of the word "flies" and the unexpected shift in the sentence structure.

Image generation



My Job

- develop new APEX applications
- maintain existing applications
- analyse and provide solutions for production issues
- peer reviews
- languages:
 - SQL
 - PL/SQL
 - HTML / CSS
 - JavaScript

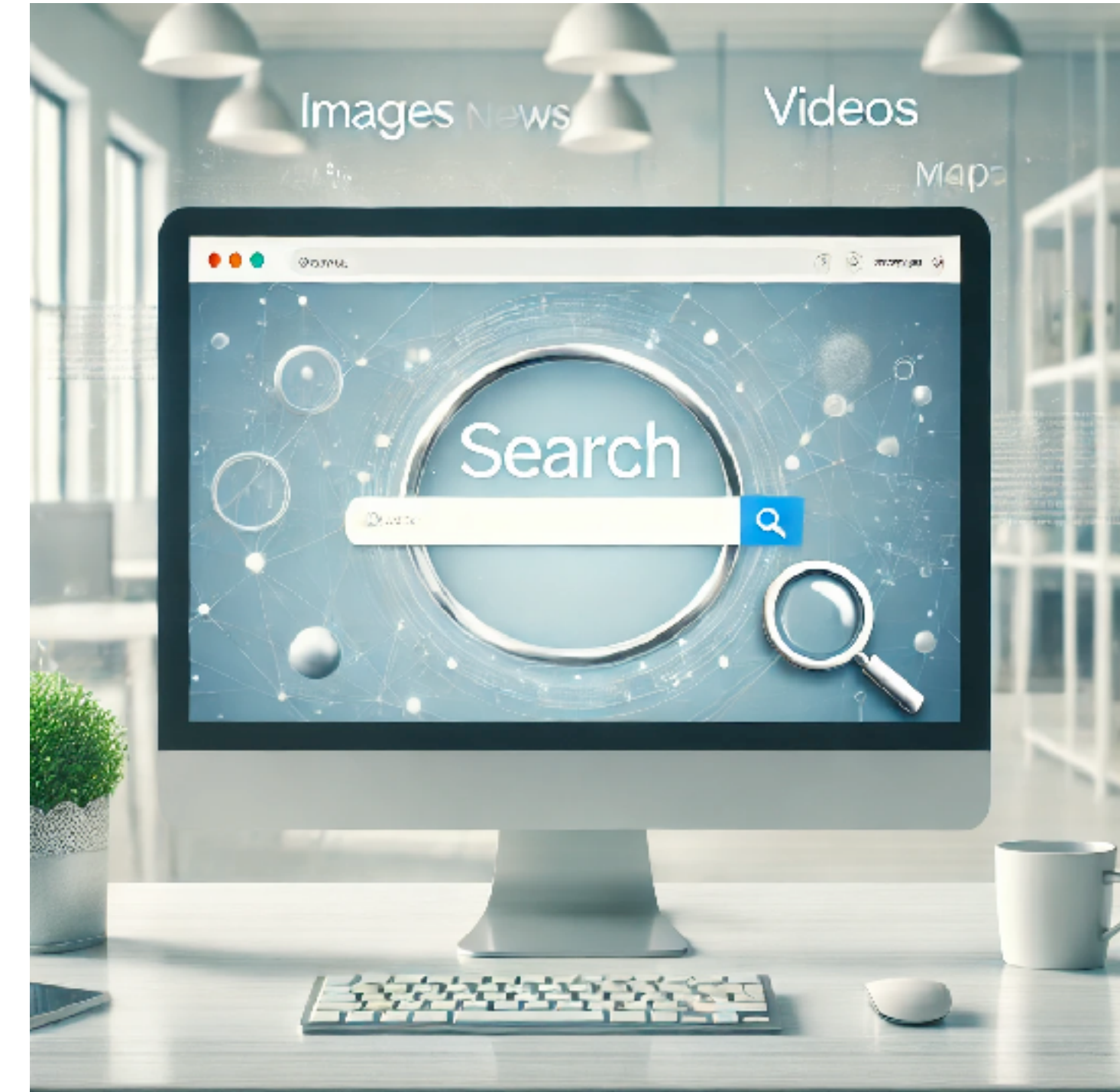


ChatGPT

- ChatGPT Free
 - uses ChatGPT 3.5, slower, usage limits, limited features, limited conversation length
- ChatGPT subscription
 - uses ChatGPT 4o, faster, less limits
 - \$ 20/month
- ChatGPT API
 - necessary to access the API, i.e. for use in APEX AI Assistant
 - pay-per-use
 - ChatGPT subscription necessary

Use case: search engine

- Using ChatGPT as Google+ or StackOverflow+
- How-to
- CSS for mobile devices



Get CSS to display objects depending on screen size



Here is the CSS code to display or hide objects depending on the screen size using media queries:

CSS

Code kopieren

```
/* Hide an element on small screens (less than 600px) */
@media only screen and (max-width: 600px) {
  .hide-on-small {
    display: none;
  }
}

/* Show an element only on small screens (less than 600px) */
@media only screen and (max-width: 600px) {
  .show-on-small {
    display: block;
  }
}
```

element with id region_web should only be visible on larger screens and element with id region_mob should be visible only on mobile devices



Here's the CSS code to achieve that:

CSS

Code kopieren

```
/* Hide #region_web on screens smaller than 768px (commonly considered mobile device) */
@media only screen and (max-width: 768px) {
  #region_web {
    display: none;
  }

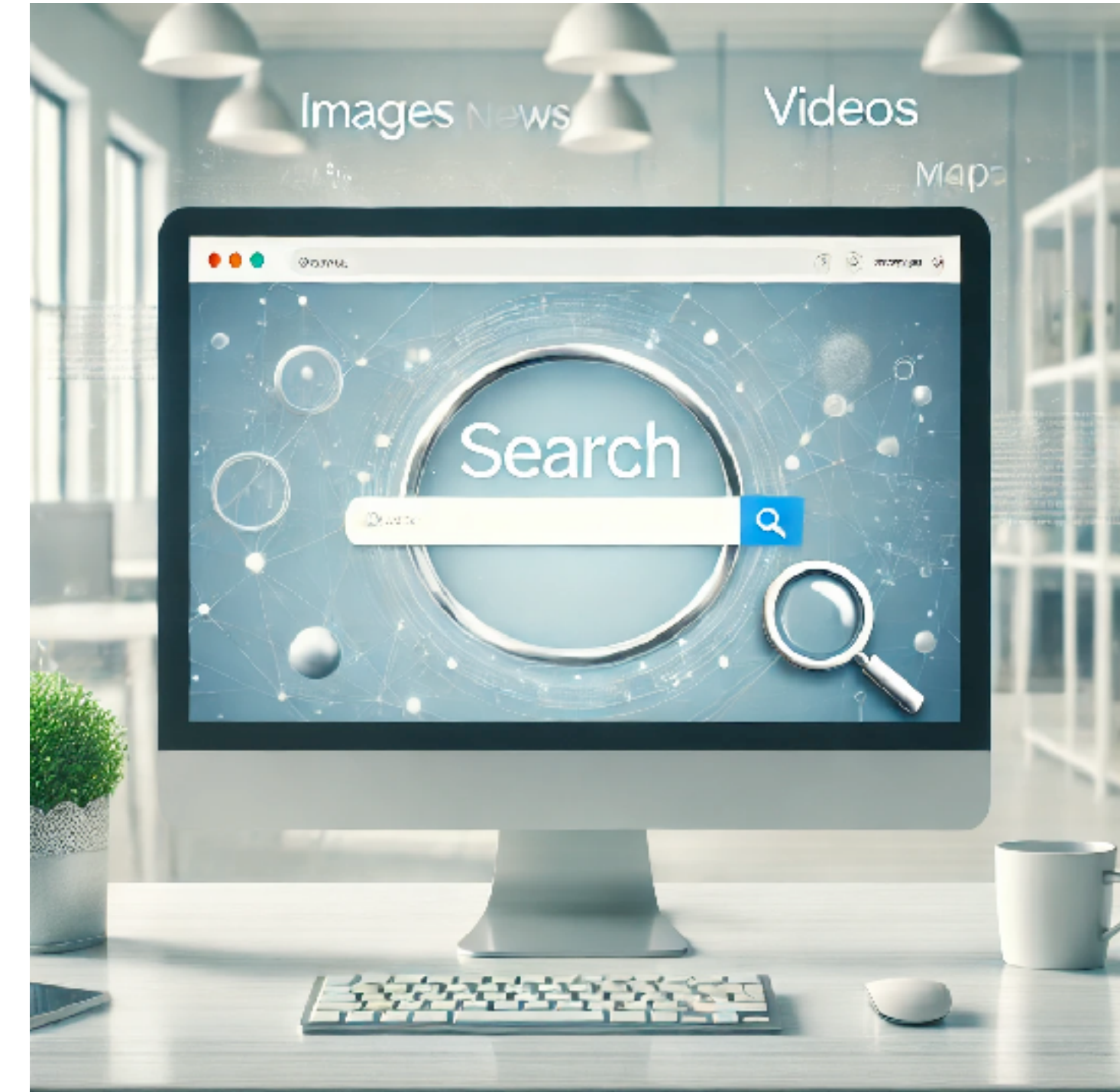
  #region_mob {
    display: block;
  }
}

/* Hide #region_mob and show #region_web on screens larger than 768px */
@media only screen and (min-width: 769px) {
  #region_web {
    display: block;
  }

  #region_mob {
    display: none;
  }
}
```

Use case: search engine

- Using ChatGPT as Google+ or StackOverflow+
- How-to
- CSS for mobile devices
- Detection of mobile device in APEX



how do i detect a mobile device in Oracle APEX



2. Using JavaScript

You can use JavaScript to detect the user agent and then set a hidden page item or pass information back to the server for processing. Here's how you can do it:

javascript

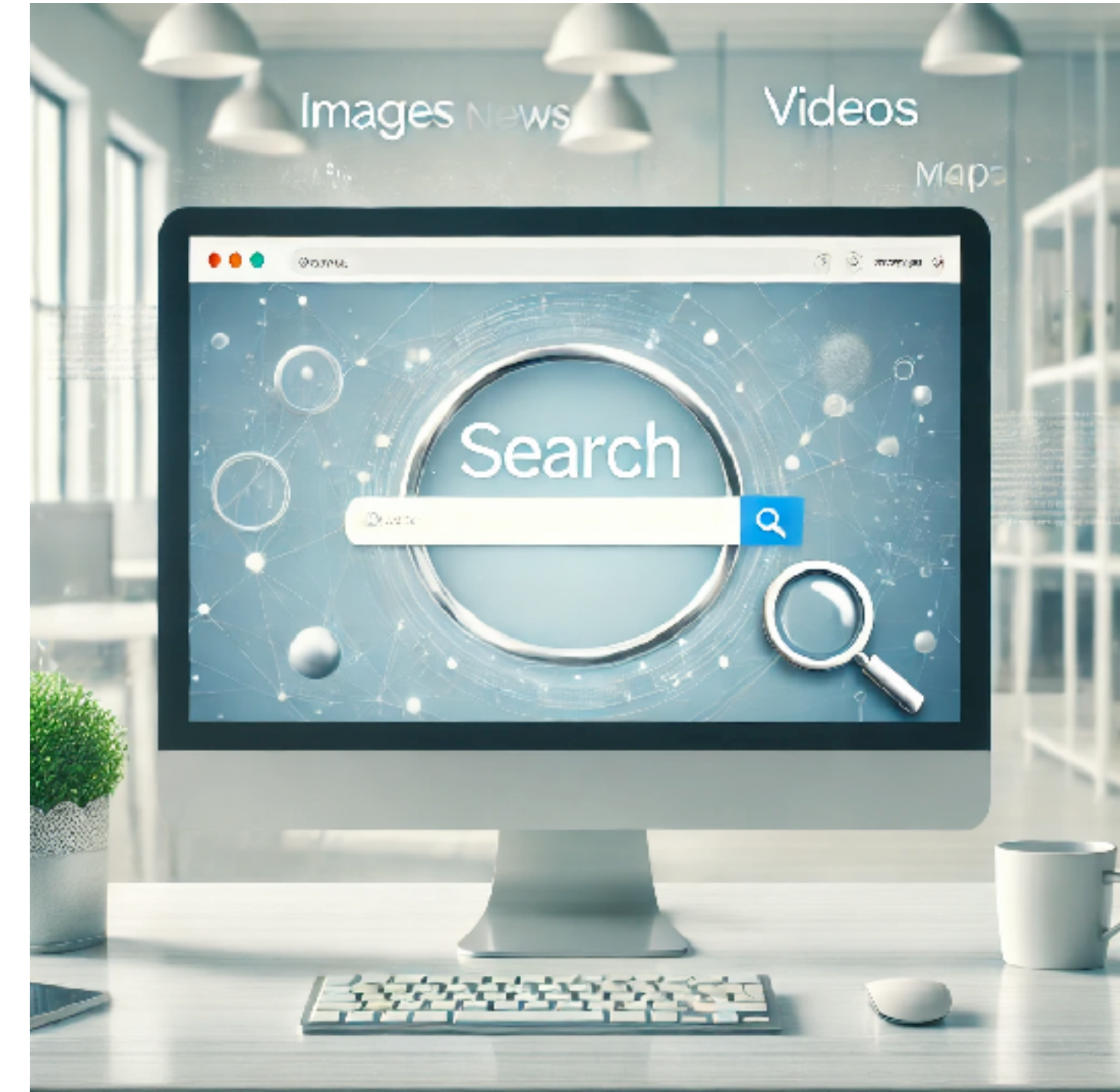
Code kopieren

```
<script>
  var isMobile = /iPhone|iPad|iPod|Android/i.test(navigator.userAgent);
  if (isMobile) {
    $s('P1_IS_MOBILE', 'Y'); // Set hidden item P1_IS_MOBILE to 'Y' for mobile
  } else {
    $s('P1_IS_MOBILE', 'N'); // Set hidden item P1_IS_MOBILE to 'N' for non-mob
  }
</script>
```

2. Using JavaScript

Use case: search engine

- Using ChatGPT as Google+ or StackOverflow+
- How-to
- CSS for mobile devices
- Detection of mobile device in APEX
- Call JavaScript in parent page



How do i call a JavaScript procedure from a popup page

On the popup page, you can use `window.opener` to reference the parent window and call the JavaScript function defined on it. For example:

```
javascript Code kopieren  
  
<script>  
  function callParentProcedure() {  
    if (window.opener) {  
      window.opener.myCustomProcedure('Hello from Popup');  
      window.close(); // Optional: Close the popup after calling the procedure  
    } else {  
      alert('No parent window found.');    }  
  }  
</script>
```

And in Oracle APEX modal page?

2. Set the Action to Execute JavaScript Code:

- In the dynamic action, choose "Execute JavaScript Code" as the action type.
- Use the following JavaScript code to call the parent page's function:

```
javascript Code kopieren  
  
if (parent && parent.myCustomProcedure) {  
    parent.myCustomProcedure('Hello from Modal');  
}
```

Use case: code generation

- extract page number from APEX url's



geef een regular expression om het Oracle APEX paginanummer uit de volgende url te halen



Hier is een reguliere expressie om het paginanummer uit een Oracle APEX URL te halen:

regex

Code kopiëren

```
f\?p=\d+:(\d+):
```

Uitleg:

- `f\?p=`: Dit matcht de beginsequentie `f?p=` in de URL.
- `\d+`: Dit matcht één of meer cijfers (de applicatie-ID).
- `:(\d+)`: Dit matcht het paginanummer, en omdat het binnen haakjes staat, wordt dit als een "capture group" beschouwd, zodat je specifiek het paginanummer kunt extraheren.

hoe gebruik ik dat in een query?

Voorbeeldquery:

Stel dat je een tabel `web_pages` hebt met een kolom `url` waarin de Oracle APEX URL's zijn opgeslagen. Je kunt het paginanummer als volgt extraheren:

sql

 Code kopiëren

```
SELECT
    url,
    REGEXP_SUBSTR(url, 'f?p=\d+:(\d+):', 1, 1, NULL, 1) AS page_number
FROM
    web_pages;
```

titel:

Use case: code generation

- extract page number from APEX url's
- generate select statement
- function to create table statements



provide an oracle plsql function to generate create table statements

Here is a PL/SQL function that generates the `CREATE TABLE` statement for an existing table in Oracle. This function queries the Oracle data dictionary views (`USER_TAB_COLUMNS`, `USER_CONSTRAINTS`, and `USER_CONS_COLUMNS`) to gather the necessary metadata for generating the SQL statement.

```

plsql
Code kopieren

CREATE OR REPLACE FUNCTION generate_create_table_statement(p_table_name IN VARCHAR2)
RETURN CLOB
IS
    l_create_stmt CLOB;
    l_column_stmt VARCHAR2(4000);
    l_constraint_stmt VARCHAR2(4000);
    l_first_column BOOLEAN := TRUE;

BEGIN
    -- Start the CREATE TABLE statement
    l_create_stmt := 'CREATE TABLE ' || p_table_name || ' (' || CHR(10);

    -- Generate column definitions
    FOR rec IN (
        SELECT column_name, data_type, data_length, data_precision, data_scale, num
        FROM user_tab_columns
        WHERE table_name = UPPER(p_table_name)
        ORDER BY column_id
    ) LOOP
        IF l_first_column THEN
            l_first_column := FALSE;
        ELSE
            l_create_stmt := l_create_stmt || ',' || CHR(10);
        END IF;

        l_column_stmt := '    ' || rec.column_name || ' ' || rec.data_type;

        IF rec.data_type IN ('VARCHAR2', 'CHAR') THEN
            l_column_stmt := l_column_stmt || '(' || rec.data_length || ')';
        ELSIF rec.data_type = 'NUMBER' THEN
            IF rec.data_precision IS NOT NULL THEN
                l_column_stmt := l_column_stmt || '(' || rec.data_precision;
                IF rec.data_scale IS NOT NULL THEN
                    l_column_stmt := l_column_stmt || ',' || rec.data_scale;
                END IF;
            END IF;
        END IF;
    END LOOP;

    l_create_stmt := l_create_stmt || l_column_stmt || ' )';
END;

```

```
-- Generate constraints (Primary Key, Unique)
FOR rec IN (
    SELECT uc.constraint_name, uc.constraint_type, ucc.column_name
    FROM user_constraints uc
    JOIN user_cons_columns ucc ON uc.constraint_name = ucc.constraint_name
    WHERE uc.table_name = UPPER(p_table_name)
    AND uc.constraint_type IN ('P', 'U')
    ORDER BY uc.constraint_name, ucc.position
) LOOP
    IF rec.constraint_type = 'P' THEN
        l_constraint_stmt := '        ,CONSTRAINT ' || rec.constraint_name || ' PR
    ELSIF rec.constraint_type = 'U' THEN
        l_constraint_stmt := '        ,CONSTRAINT ' || rec.constraint_name || ' UN
    END IF;

    -- Handling composite keys
    FOR rec2 IN (
        SELECT ucc.column_name
        FROM user_cons_columns ucc
        WHERE ucc.constraint_name = rec.constraint_name
        AND ucc.table_name = UPPER(p_table_name)
        ORDER BY ucc.position
    ) LOOP
        IF rec2.column_name != rec.column_name THEN
            l_constraint_stmt := l_constraint_stmt || ', ' || rec2.column_name
        END IF;
    END LOOP;

    l_constraint_stmt := l_constraint_stmt || ');';
    l_create_stmt := l_create_stmt || ', ' || CHR(10) || l_constraint_stmt;
END LOOP;

-- Close the CREATE TABLE statement
l_create_stmt := l_create_stmt || CHR(10) || ');';

RETURN l_create_stmt;
END generate_create_table_statement;
/
```

Use case: code generation

- extract page number from APEX url's
- generate select statement
- function to create table statements
- function to check IBAN numbers



is there a plsql function to check an iban number

```
plsql Code kopieren

CREATE OR REPLACE FUNCTION validate_iban(p_iban IN VARCHAR2)
RETURN BOOLEAN
IS
    l_iban VARCHAR2(2000);
    l_numeric_iban VARCHAR2(4000);
    l_remainder NUMBER;
    l_char CHAR(1);
BEGIN
    -- Remove any spaces from the IBAN
    l_iban := UPPER(REPLACE(p_iban, ' ', ''));

    -- Move the first four characters to the end of the string
    l_iban := SUBSTR(l_iban, 5) || SUBSTR(l_iban, 1, 4);

    -- Convert the letters to numbers
    l_numeric_iban := '';
    FOR i IN 1 .. LENGTH(l_iban) LOOP
        l_char := SUBSTR(l_iban, i, 1);
        IF l_char BETWEEN 'A' AND 'Z' THEN
            l_numeric_iban := l_numeric_iban || (ASCII(l_char) - 55);
        ELSE
            l_numeric_iban := l_numeric_iban || l_char;
        END IF;
    END LOOP;

    -- Perform the MOD-97 operation
    l_remainder := TO_NUMBER(SUBSTR(l_numeric_iban, 1, 9)) MOD 97;
    l_numeric_iban := SUBSTR(l_numeric_iban, 10);

    WHILE LENGTH(l_numeric_iban) > 0 LOOP
        l_remainder := TO_NUMBER(l_remainder || SUBSTR(l_numeric_iban, 1, LEAST(LENGTH(l_numeric_iban), 7))) MOD 97;
        l_numeric_iban := SUBSTR(l_numeric_iban, LEAST(LENGTH(l_numeric_iban), 7) + 1);
    END LOOP;

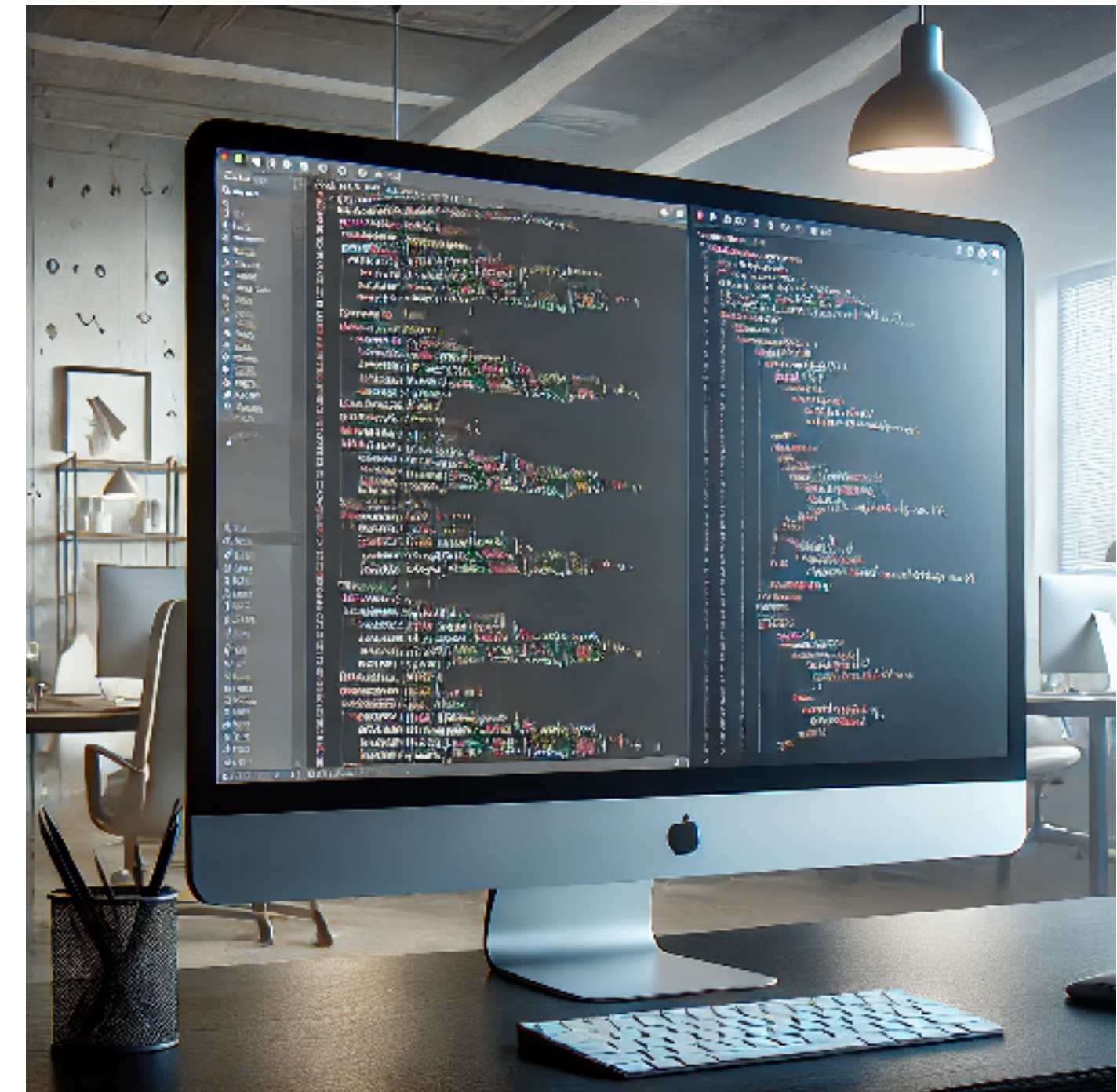
    -- If the remainder is 1, the IBAN is valid
    RETURN l_remainder = 1;
EXCEPTION
    WHEN OTHERS THEN
        RETURN FALSE; -- Return FALSE if any error occurs during validation
END validate_iban;
/
```

Use case: code formatting / refactoring

- Formatting: define rules

conversion rules:

- initial 3 space indent
- 3 space indent
- in module signature:
 - put opening bracket after module name
 - put first argument on same line as opening bracket separated by a space
 - align argument separating comma's and align the closing bracket with the opening bracket
 - align the closing bracket argument separating comma's or the opening bracket



please format the code to the rules given

```
FUNCTION compress_whitespace(i_text IN VARCHAR2) RETURN
VARCHAR2 IS
/* In this function the variable scope is used to indicate the scope
of the program
*/
v_return  VARCHAR2(32767) := NULL;
v_teken   VARCHAR2(1)    := NULL;
v_whitespace BOOLEAN     := TRUE;
scope     VARCHAR2(100 CHAR) := scope_base ||
'compress_whitespace';
params    logger.t_parameters;
BEGIN
logger.add_parameter(params, 'i_text', i_text);
logger.log('START', scope, NULL, params);

FOR i IN 1..LENGTH(i_text) LOOP
v_teken := SUBSTR(i_text, i, 1);
IF v_teken IN (' ', CHR(9), CHR(10), CHR(13)) THEN
IF NOT v_whitespace THEN
v_return := v_return || ' ';
v_whitespace := TRUE;
END IF;
ELSE
v_return := v_return || v_teken;
v_whitespace := FALSE;
END IF;
END LOOP;

logger.add_parameter(params, 'v_return', v_return);
logger.log('START', scope, NULL, params);

RETURN v_return;
END;
```



Here's your `compress\_whitespace` function with the requested formatting, all in lowercase:

```
plsql Code kopieren

function compress_whitespace (i_text in varchar2)
return varchar2
is
    /* in this function the variable scope is used to indicate the scope of the p
    v_return    varchar2(32767)    := null;
    v_teken     varchar2(1)        := null;
    v_whitespace boolean           := true;
    scope       varchar2(100 char) := scope_base || 'compress_whitespace';
    params      logger.t_parameters;
begin
    logger.add_parameter(params, 'i_text', i_text);
    logger.log('start', scope, null, params);

    for i in 1..length(i_text) loop
        v_teken := substr(i_text, i, 1);
        if v_teken in (' ', chr(9), chr(10), chr(13)) then
            if not v_whitespace then
                v_return    := v_return || ' ';
                v_whitespace := true;
            end if;
        else
            v_return    := v_return || v_teken;
            v_whitespace := false;
        end if;
    end loop;

    logger.add_parameter(params, 'v_return', v_return);
    logger.log('start', scope, null, params);

    return v_return;
end compress_whitespace;
```



Use case: code refactoring

- Refactoring: define rules



apply the following rules:

- add the name of the module to the end statement
- add the char keyword to the length of varchar2 variables
- logger.log has the arguments p_text, p_scope, p_extra, p_params.
- logger.append_param has the argument p_params, p_name, p_val.
- rename the variable scope to l_scope
- rename the variable params to t_params
- convert the logger calls to named parameters, having all of the arguments on one line without explanation



apply the rules

Here's your `compress\_whitespace` function with the requested formatting, all in lowercase:

```
plsql Code kopieren

function compress_whitespace (i_text in varchar2)
return varchar2
is
    /* in this function the variable scope is used to indicate the scope of the
    v_return    varchar2(32767)    := null;
    v_teken     varchar2(1)        := null;
    v_whitespace boolean          := true;
    scope       varchar2(100 char) := scope_base || 'compress_whitespace';
    params      logger.t_parameters;
begin
    logger.add_parameter(params, 'i_text', i_text);
    logger.log('start', scope, null, params);

    for i in 1..length(i_text) loop
        v_teken := substr(i_text, i, 1);
        if v_teken in (' ', chr(9), chr(10), chr(13)) then
            if not v_whitespace then
                v_return := v_return || ' ';
                v_whitespace := true;
            end if;
        else
            v_return := v_return || v_teken;
            v_whitespace := false;
        end if;
    end loop;

    logger.add_parameter(params, 'v_return', v_return);
    logger.log('start', scope, null, params);

    return v_return;
end compress_whitespace;
```

```
plsql Code kopieren

function compress_whitespace (i_text in varchar2)
return varchar2
is
    /* in this function the variable l_scope is used to indicate the scope of the
    v_return    varchar2(32767 char)    := null;
    v_teken     varchar2(1 char)        := null;
    v_whitespace boolean              := true;
    l_scope      varchar2(100 char)     := scope_base || 'compress_whitespace';
    t_params     logger.t_parameters;
begin
    logger.append_param(p_params => t_params, p_name => 'i_text', p_val => i_text);
    logger.log(p_text => 'start', p_scope => l_scope, p_extra => null, p_params => t_params);

    for i in 1..length(i_text) loop
        v_teken := substr(i_text, i, 1);
        if v_teken in (' ', chr(9), chr(10), chr(13)) then
            if not v_whitespace then
                v_return := v_return || ' ';
                v_whitespace := true;
            end if;
        else
            v_return := v_return || v_teken;
            v_whitespace := false;
        end if;
    end loop;

    logger.append_param(p_params => t_params, p_name => 'v_return', p_val => v_return);
    logger.log(p_text => 'start', p_scope => l_scope, p_extra => null, p_params => t_params);

    return v_return;
end compress_whitespace;
```

Use case: code reviewing

- Suggestions
- Corrections



do you have an alternative version using a regular expression?



Yes, you can use a regular expression to achieve the same result with a more concise approach. Here's an alternative version of your `compress_whitespace` function using the `REGEXP_REPLACE` function:

plsql

Code kopieren

```
function compress_whitespace (i_text in varchar2)
return varchar2
is
    v_return varchar2(32767 char);
begin
    if i_text is null then
        return null;
    end if;

    v_return := regexp_replace(i_text, '\s+', ' ');

    return trim(v_return);
end compress_whitespace;
```

ChatGPT tips

- Custom instructions
- Save prompt for setting of context (formatting etc.)
- Work iteratively
- let ChatGPT review it's own code

APEX 24.1 AI Assistant

- Setting up AI Assistant
- ChatGPT API
- None of your tables or columns



The art of
System Prompts
Engineering
in Oracle APEX

APEX and the LLM System Prompts

See how APEX uses the Generative AI Services to help you write code

 Plamen Mushkov · Jul 8, 2024 · 12 min read

APEX 24.1 AI Assistant

- Setting up AI Assistant
- ChatGPT API
- ~~Context automatically available~~
- Available:
 - SQL Workshop
 - editing code in Object Browser
 - editing code in APEX Builder
- Select AI

APEX AI Assistant: variations

```
declare
  l_count integer := 0;
begin
  for r in (
select mms.id as mms_id
      , pmt.status
      , pmt.datetime
from memberships mms
join members_vw mem
  on mem.id = mms.member
join payments pmt
  on pmt.member_id = mem.id
 and pmt.status = 'paid'
join contribution_types cte
  on cte.id = mms.contribution_type
 and cte.title = 'Aspirantlid'
) loop
  update memberships
  set paid = 1
    , pay_date = r.datetime
  where id = r.mms_id;
  l_count := l_count + sql%rowcount;
end loop;
dbms_output.put_line(l_count||' rows updated');
end;
```

```
merge update memberships mms
using (
  set paid = 1,
  pay_date = (select pmt.datetime
               from members mem
               join payments pmt
                 on pmt.member_id = mem.id
               and pmt.status = 'paid'
               join contribution_types cte
                 on cte.id = mms.contribution_type
               and cte.title = 'Aspirantlid'
               where mem.id = mms.member)
) src
on (mms.id = src.mms_id)
when matched then
  update
  set
    paid = 1,
    pay_date = src.pay_date
  where exists (select 1
                from members mem
                join payments pmt
                  on pmt.member_id = mem.id
                and pmt.status = 'paid'
                join contribution_types cte
                  on cte.id = mms.contribution_type
                and cte.title = 'Aspirantlid'
                where mem.id = mms.member);
```

Caveat: correctness

- In (quite) some cases not correct
- It is called hallucinations
- Attorney using ChatGPT
- Lack of understanding(Kyle Hill) :
- Remember: Internet is not accessed!

ChatGPT: US lawyer admits using AI for



A New York lawyer is facing a court hearing on his own after his firm used AI tool ChatGPT for legal research.

A judge said the court was faced with an "unprecedented circumstance" after a filing was found to reference example legal cases that did not exist.

The lawyer who used the tool told the court he was "unaware that its content could be false".

ChatGPT creates original text on request, but comes with warnings it can "produce inaccurate information".

Caveat: information security

- Information is shared on the internet
- Is your organization
- Profile > Settings > Improve the model f

Services for individuals, such as ChatGPT and DALL•E

When you use our services for individuals such as ChatGPT or DALL•E, we may use your content to train our models.

You can opt out of training through our [privacy portal](#) by clicking on "do not train on my content," or to turn off training for your ChatGPT conversations, follow the instructions in our [Data Controls FAQ](#). Once you opt out, new conversations will not be used to train our models.

Services for businesses, such as ChatGPT Team, ChatGPT Enterprise, and our API Platform

We don't use content from our business offerings such as ChatGPT Team, ChatGPT Enterprise, and our API Platform to train our models. Please see our [Enterprise Privacy page](#) for information on how we handle business data.

Caveat: information security

- Information is shared on the internet
- Is your organization OK with that?
- Alternatives:
 - local LLM
- ollama.com
 - Download Ollama for your OS
 - First time the LLM must be downloaded
 - Then AI even without connection

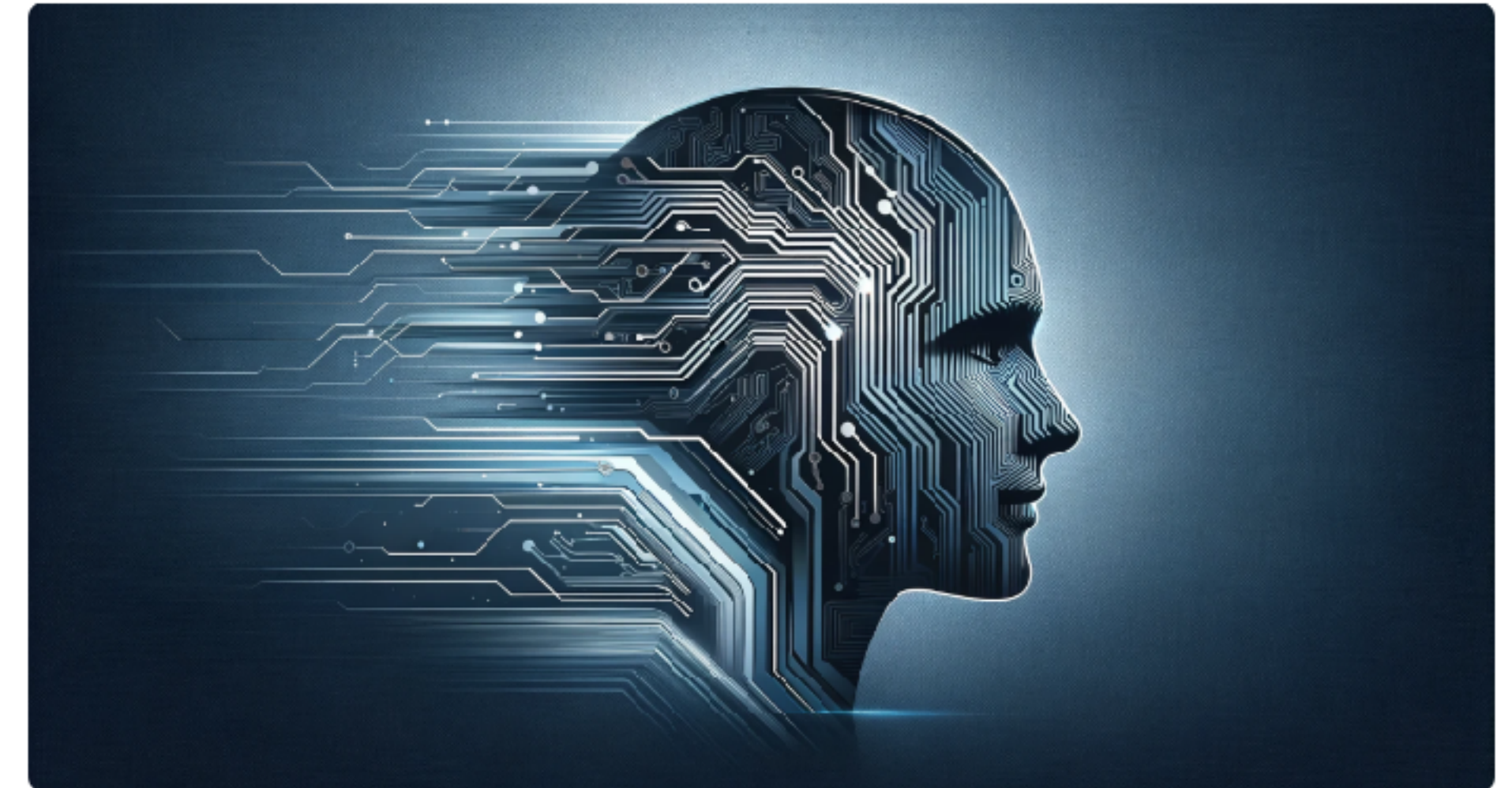


Threat : job security

- AI won't replace you, but someone using AI will
- The job of white collar workers will change
- So also the job of us developers

LinkedIn

Artikelen Personen Learning Vacatures G



DALL-E: AI Enhancing Human Capabilities

AI Won't Replace You, But Someone Using AI Will: Navigating the Future of Work in the Enterprise



Nathan Pearce

Generative AI Development, Education, Positioning, and Marketing

Gepubliceerd op 2 mei 2024

+ Volgen

Other Threats

- Limitless production of fake news and fake video's
- Enormous power for the owners of the AI
- Autonomous weapons
- Future?

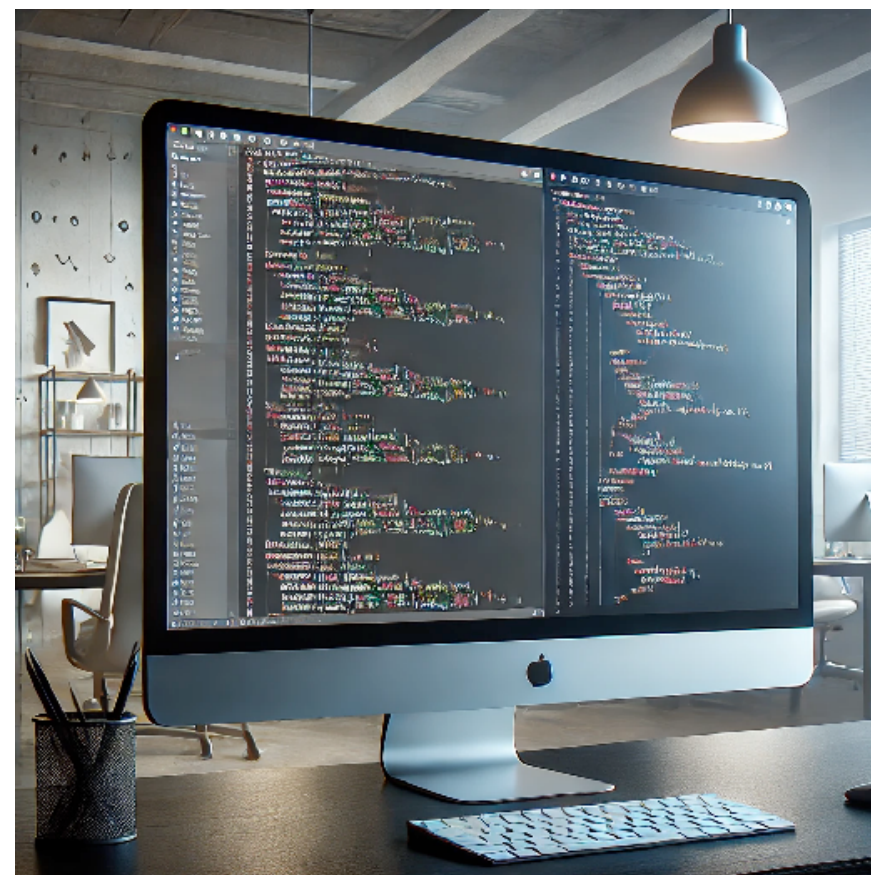
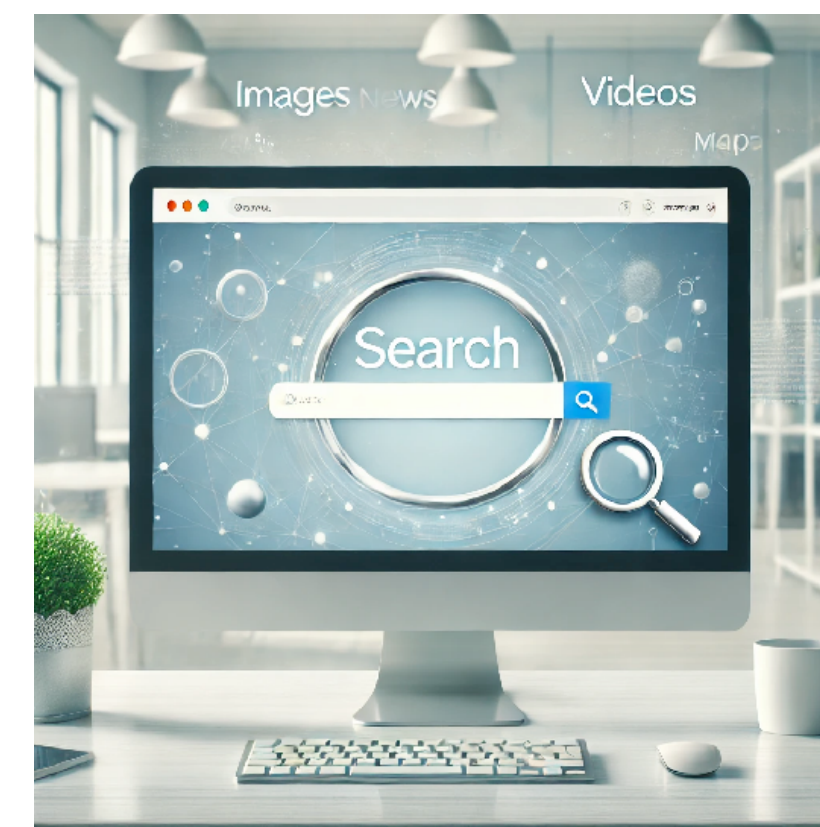
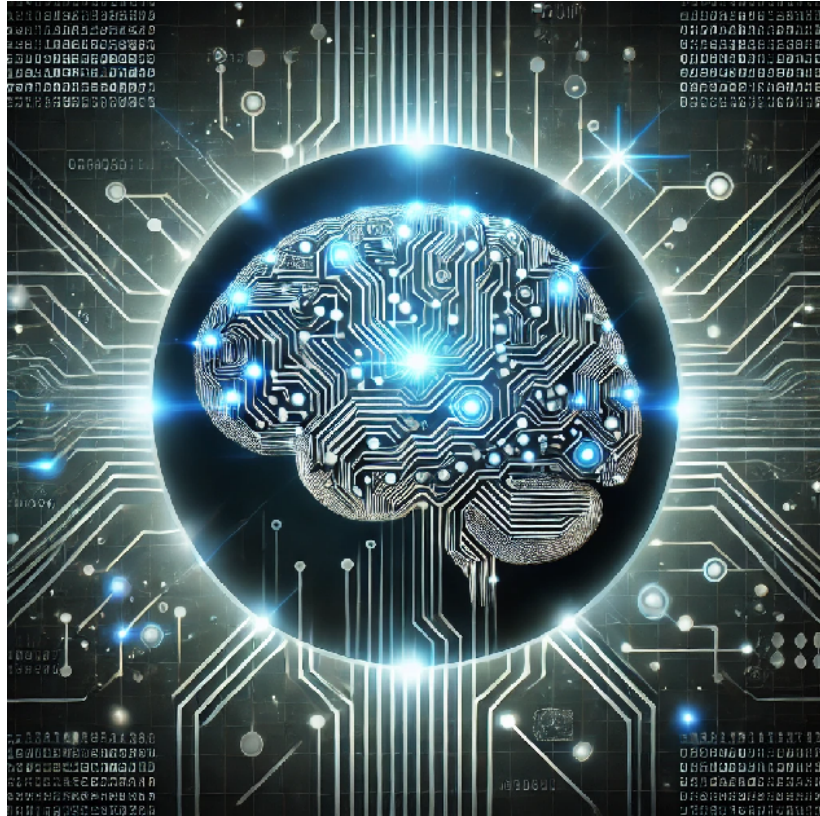


Wrap up

- Amazing, sometimes mind blowing capabilities
- Can relieve us of tedious tasks
- Always check the generated code/text
- Limitations:
 - correctness
 - information security



Generated images



Resources

- Dick Dral
E-mail: dick.dral@detora.nl
Blog: [dickdral@blogspot.nl](https://dickdral.blogspot.nl)
- ChatGPT: openai.com
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