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01.1

(a) Expert systems are AI-based programs that simulate human experitise in specific domains. They use a knowledge base and inference engine to analyze data and provide recommondations or solutions.

eg: In medical diagnosis, and expert system can suggest potential diseases based on symptoms provided by the user.

01.(b) Computer vision is a field of AI that enables computers to interpret and understand visual information from images or videos.

- Facial Recognition : Analyzes facial features to identyfy individuals, commonly used in security systems.
- Self-Driving Cars : Uses cameras and sensors to detect objects, lanes, traffic signs, and pedestrians to navigate safely.

01.(c) ① Variability in Lighting conditions : Poor lighting can affect image reccognition accuracy.

② object Occlusion : Object maybe partially hidden, making dettection difficult.

③ High Computational Cost : Prossesing large amounts of image data requires significant computing power.

④ Real-time processing : Achieving fast and accurate results in applications like self-driving cars is challenging.

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01. (d) • Bias : AI systems may develop biases if trained on biased data, leading to unfair outcomes.

• Privacy : AI in surveillance or data collection may invade users' personal privacy.

Ways to make AI More Ethical:

(1) Fair Data Collection : Ensure diverse and unbiased datasets.

(2) Transparency : Make AI decision-making process-es explainable.

(3) Regulations : Implement policies to protect users privacy and writes.

(4) Human Oversights : AI diesisions should be reviewed by humans where necessary

01. (e) AI is transforming various industries by improving efficiency, accuracy, and automation.

1. Healthcare : AI helps in diagnosing diseases and predicting petient conditions.

2. Finance : Detects fraud and automates trading systems.

3. Manufacturing : Enhances automation in production lines, reducing costs.

4. Customer Service : AI-powered chatbots provide 24/7 support.

5. Transportation : Enables self-driving vehicles and smart traffic management

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02(a)

```
abc = "program"

def user_define_funct():
    x = "open source."
    print("Python is" + abc)
    print("Python is + x)

user_define_funct()
```

02 (b) Python is considered and interpreted language because its code is executed line by line at runtime by the debbuging easier but may result in slower performance compared to compiled languages.

02 (c) ① Easy to Read and Write : python uses simple syntax, making it begginer - friendly.

② Interpreted Language : No need for compilation; executed directly by an interpreter.

③ Dynamically Typed : No need to declare variable types explicity.

④ Cross - Platform Compatibility : Runs on multiple operating systems like Windows, macOS, and Linux.

⑤ Extensive Libraries : Comes with powerfull libraries for AI, machine learning, web development, and more.

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02.(d) Valid Variable Names:

1. student_name
2. age_25
3. _data_value

Invalid Variable Names:

1. 25age (cannot start with a number)
2. student-name (Hyphens - are not allowed, use _ instead)
3. class (class is reserved keyword in python)

Rules for Variable Naming:

1. Must start with a letter (a-z, A-Z) or an underscores _.
2. cannot start with a number.
3. Can only contain letters, numbers, and underscores (_).
4. cannot use python reserved keywords like if, class, def, etc.

02.(e)

i. $25 \times 6 + 3 = 153$

ii. $15.0 + 6.0 - 4.0 = 17.0$

iii. $10.8 \times 45 // 5 = 97.0$

iv. $9^3 + 5 - 2 // 4 = 729 + 5 - 0 = 734$

v. $2^3 + 4 + 9 - 7 \% 4 = 8 + 4 + 9 - 3 = 18$

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03.(a) i.

Output

```
9
36
81
144
225
324
```

ii.

Output

```
1
x
2
x
```

iii.

Output

```
20
```

03.(b)

1. True
2. False
3. True
4. True
5. True

03(c)

```
rows = 5
k = 2 * rows - 2

for i in range (0, rows):
    for j in range (0, k):
        print (end = " ")
    k = k - 1

    for j in range (0, i+1):
        print ("* ", end = " ")
    print (" ")
```

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03.(d)

```
i = 1
while i <= 10:
    print ("Python Programing")
    i += 1
```

03.(e)

```
list 1 = [12, 15, 32, 42, 55, 75, 122, 132, 150, 180
                                                -200]

for num in list 1:
    if num > 150
        break
    if num % 5 == 0:
        print num
```