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Факультет информатика и системы управления

Кафедра системы обработки информации и управления

Курс «Парадигмы и конструкции языков программирования»

Отчет по ДЗ

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Подпись и дата:

Москва, 2025 г

Текст программы

models.py

```
from django.db import models
from django.utils.text import slugify
from django.contrib.auth.models import AbstractUser
from django.db.models import Sum

class DefaultModel(models.Model):
    class Meta:
        abstract = True

    is_active = models.BooleanField(default=True, verbose_name="Активен?")
    created_at = models.DateTimeField(auto_now_add=True, verbose_name="Время создания", editable=False, null=True)
    updated_at = models.DateTimeField(auto_now=True, verbose_name="Время обновления", editable=False, null=True)

class User(AbstractUser):
    avatar = models.ImageField(upload_to='avatars', null=True, blank=True)

    class Meta:
        verbose_name = 'Пользователь'
        verbose_name_plural = 'Пользователи'

from django.db.models import Sum

class QuestionManager(models.Manager):
    def new(self):
        return self.all().order_by('-created_at')

    from django.db.models import Sum

    def hot(self):
        return self.annotate(score_total=Sum('likes__value')).order_by('-score_total', '-created_at')

    def by_tag(self, tag):
        return self.filter(tags=tag).order_by('-created_at')

class Question(DefaultModel):
    class Meta:
        verbose_name = 'Вопрос'
        verbose_name_plural = 'Вопросы'

    slug = models.SlugField(max_length=200, unique=True, null=True, blank=True)
```

```

title = models.CharField(max_length=200)
text = models.TextField()
author = models.ForeignKey(User, on_delete=models.CASCADE)
tags = models.ManyToManyField('Tag', blank=True, verbose_name="Теги")
objects = QuestionManager()

def __str__(self):
    return str(self.title)

def save(self, *args, **kwargs):
    self.slug = slugify(self.title, allow_unicode=True)
    return super(Question, self).save(*args, **kwargs)

@property
def score(self):
    result = self.likes.aggregate(score=Sum('value'))['score'] or 0
    return result

class Answer(DefaultModel):
    class Meta:
        verbose_name = 'Ответ'
        verbose_name_plural = 'Ответы'

    question = models.ForeignKey(Question, on_delete=models.CASCADE)
    author = models.ForeignKey(User, on_delete=models.CASCADE)
    answer_text = models.TextField()

    is_correct = models.BooleanField(default=False)

    def __str__(self):
        return "Ответ на вопрос ID=" + str(self.question_id)

    @property
    def score(self):
        result = self.likes.aggregate(score=Sum('value'))['score'] or 0
        return result

class Tag(models.Model):
    class Meta:
        verbose_name = 'Тег'
        verbose_name_plural = 'Теги'

    title = models.CharField(max_length=200, verbose_name="Название тега")

    def __str__(self):
        return self.title

class AnswerLike(models.Model):

```

```

class Meta:
    verbose_name = 'Лайк ответа'
    verbose_name_plural = 'Лайки ответов'
    unique_together=('answer', 'user')

    LIKE = 1
    DISLIKE = -1
    VALUE_CHOICES = [
        (LIKE, 'лайк'),
        (DISLIKE, 'дизлайк'),
    ]

    answer = models.ForeignKey(Answer, on_delete=models.CASCADE,
related_name="likes")
    user = models.ForeignKey(User, on_delete=models.CASCADE)

    value = models.SmallIntegerField(
        choices=VALUE_CHOICES,
        default=LIKE,
        verbose_name="Лайк/дизлайк"
    )

    def __str__(self):
        return f"Был поставлен {dict(self.VALUE_CHOICES).get(self.value)}
пользователем {self.user} на ответ {self.answer}"
# НАСК: сделать так, чтобы в админке можно было менять лайк на дизлайк

class QuestionLike(models.Model):
    class Meta:
        verbose_name = 'Лайк вопроса'
        verbose_name_plural = 'Лайки вопросов'
        unique_together=('question', 'user')

        LIKE = 1
        DISLIKE = -1
        VALUE_CHOICES = [
            (LIKE, 'Like'),
            (DISLIKE, 'Dislike'),
        ]

        question = models.ForeignKey(Question, on_delete=models.CASCADE,
related_name="likes")
        user = models.ForeignKey(User, on_delete=models.CASCADE)
        value = models.SmallIntegerField(
            choices=VALUE_CHOICES,
            default=LIKE,
            verbose_name="Лайк/дизлайк"
        )

    def __str__(self):

```

```
        return f"Был поставлен {dict(self.VALUE_CHOICES).get(self.value)}  
пользователем {self.user}"
```

views.py

```
from django.shortcuts import render  
from django.core.paginator import Paginator, EmptyPage, PageNotAnInteger  
from django.views.generic import TemplateView, View  
from django.shortcuts import get_object_or_404  
from django.utils.decorators import method_decorator  
  
from django.views.decorators.cache import never_cache  
from django.contrib.auth.decorators import login_required  
  
from app.models import User, Question, Answer, Tag, AnswerLike, QuestionLike  
  
from app.forms import LoginForm, QuestionForm, RegisterForm, AnswerForm  
  
from django.http import JsonResponse  
  
from django.shortcuts import redirect  
  
from django.contrib.auth import login, logout  
from django.contrib import messages  
  
from datetime import datetime  
  
def get_page_range(page, paginator):  
    current = page.number  
    last = paginator.num_pages  
  
    start_pages = [1, 2, 3]  
    end_pages = [last - 2, last - 1, last]  
  
    middle_pages = [  
        current - 1,  
        current,  
        current + 1  
    ]  
  
    pages = set()  
  
    for p in start_pages + middle_pages + end_pages:  
        if 1 <= p <= last:  
            pages.add(p)  
  
    pages = sorted(pages)
```

```

final = []
for i, p in enumerate(pages):
    final.append(p)

    if i < len(pages) - 1:
        next_p = pages[i+1]
        if next_p - p > 1:
            final.append("...")

return final

def paginate(objects_list, page_number, per_page=10):
    paginator = Paginator(objects_list, per_page)
    try:
        page = paginator.page(page_number)
    except PageNotAnInteger:
        page = paginator.page(1)
    except EmptyPage:
        page = paginator.page(paginator.num_pages)
    return page

@method_decorator(never_cache, name='dispatch')
class QuestionListView(TemplateView):
    template_name = "app/index.html"
    QUESTIONS_PER_PAGE = 4

    def get_queryset_and_meta(self):
        """
        Возвращает:
        queryset, page_type, page_title, tag (или None)
        """
        filter_type = self.request.GET.get('filter')
        tag_name = self.request.GET.get('tag_name')

        if filter_type == 'hot':
            return (
                Question.objects.hot(),
                'hot',
                'Hot Questions',
                None
            )

        if filter_type == 'tag' and tag_name:
            tag = get_object_or_404(Tag, title=tag_name)
            return (
                Question.objects.by_tag(tag),
                'tag',
                f'Tag: {tag.title}',
                tag
            )

```

```

        return (
            Question.objects.new(),
            'new',
            'New Questions',
            None
        )

def get_context_data(self, **kwargs):
    context = super().get_context_data(**kwargs)

    page_number = self.kwargs.get('page') or self.request.GET.get('page', 1)
    try:
        page_number = int(page_number)
    except ValueError:
        page_number = 1

    queryset, page_type, page_title, tag = self.get_queryset_and_meta()

    paginator = Paginator(queryset, self.QUESTIONS_PER_PAGE)

    try:
        page_obj = paginator.page(page_number)
    except PageNotAnInteger:
        page_obj = paginator.page(1)
    except EmptyPage:
        page_obj = paginator.page(paginator.num_pages)

    context.update({
        "questions": page_obj.object_list,
        "page": page_obj,
        "pages": get_page_range(page_obj, paginator),
        "max_page": paginator.num_pages,

        "page_type": page_type,
        "page_title": page_title,
        "tag": tag,

        "filter": self.request.GET.get('filter'),
        "tag_name": self.request.GET.get('tag_name'),

        "tags": Tag.objects.all(),
    })

    return context

#TODO: добавить дату
@method_decorator(login_required, name='dispatch')
class QuestionView(TemplateView):
    http_method_names = ['get', 'post']
    template_name = 'app/question.html'

```

```

ANSWERS_PER_PAGE = 4

def get_context_data(self, **kwargs):
    context = super().get_context_data(**kwargs)

    question_id = kwargs.get('question_id')
    page_number = kwargs.get('page') or int(self.request.GET.get('page', 1))

    if 'form' not in context:
        context['form'] = AnswerForm()

    question = Question.objects.prefetch_related('tags').get(id=question_id)

    answers_list = Answer.objects.filter(question=question).order_by('-
created_at')

    paginator = Paginator(answers_list, self.ANSWERS_PER_PAGE)
    try:
        page_obj = paginator.page(page_number)
    except PageNotAnInteger:
        page_obj = paginator.page(1)
    except EmptyPage:
        page_obj = paginator.page(paginator.num_pages)

    page_range = get_page_range(page_obj, paginator)

    context['question'] = question
    context['answers'] = page_obj.object_list
    context['page'] = page_obj
    context['page_range'] = page_range
    context['answers_per_page'] = self.ANSWERS_PER_PAGE
    context['max_page'] = paginator.num_pages

    return context

def dispatch(self, request, *args, **kwargs):
    print(request)
    return super(QuestionView, self).dispatch(request, *args, **kwargs)

def post(self, request, *args, **kwargs):
    question_id = kwargs.get('question_id')

    question = get_object_or_404(Question, id=question_id)

    form = AnswerForm(request.POST)

    if form.is_valid():
        answer = form.save(commit=False)

        answer.author = request.user
        answer.question = question

```



```

        answer.save()

        messages.add_message(request, messages.SUCCESS, "Ваш ответ
опубликован!")
        return redirect("question", question_id=question_id)

    return render(request, "app/question.html", {"form": form})

def ask(request):
    return render(request, "app/ask.html")

def settings(request):
    if request.method == 'POST':
        if 'avatar' in request.FILES:
            user = request.user
            user.avatar = request.FILES['avatar']
            user.save()
            return redirect('settings')
    return render(request, "app/settings.html")

def tag(request, tag_name, page):
    questions = []
    for i in range(1, 30):
        questions.append({
            'id': i,
            'title': f'What is Frutiger Aero? {i}',
            'text': 'Guys, tell me more about the aesthetics of the early
internet!',
            'votes': 42,
            'count': 3,
            'tags': ['frutiger_aero', '2000s'],
        })

    paginator = Paginator(questions, 5)
    try:
        page_obj = paginator.page(page)
    except PageNotAnInteger:
        page_obj = paginator.page(1)
    except EmptyPage:
        page_obj = paginator.page(paginator.num_pages)

    page_range = get_page_range(page_obj, paginator)

    return render(request, "tag.html", {
        'tag_name': tag_name,
        'questions': page_obj.object_list,
        'page': page_obj,
        'page_range': page_range
    })

```

```

class AuthView(TemplateView):
    http_method_names = ['get', 'post']
    template_name = 'app/login.html'

    def get_context_data(self, **kwargs):
        form = LoginForm()
        context = super(AuthView, self).get_context_data(**kwargs)
        context['form'] = form
        return context

    def post(self, request, *args, **kwargs):
        form = LoginForm(request.POST, request.FILES)

        if form.is_valid():
            login(request, form.user)
            messages.add_message(request, messages.SUCCESS, "Вы успешно авторизованы в вашем аккаунте")
            return redirect("/")
        return render(request, "app/login.html", {"form": form})

@login_required
def logout_view(request):
    logout(request)
    return redirect("/login")

@method_decorator(login_required, name='dispatch')
class CreateQuestionView(TemplateView):
    http_method_names = ['get', 'post']
    template_name = 'app/ask.html'

    def get_context_data(self, **kwargs):
        context = super(CreateQuestionView, self).get_context_data(**kwargs)
        context['form'] = QuestionForm()
        return context

    def post(self, request, *args, **kwargs):
        form = QuestionForm(request.POST)
        if form.is_valid():
            question = form.save(commit=False)
            question.author = request.user
            #question.cover = request.FILES['image']
            question.save()
            print(request)
            return redirect('index')

        return render(request, 'app/ask.html', {'form': form})

class RegisterView(TemplateView):
    http_method_names = ['get', 'post']
    template_name = 'app/signup.html'

```

```

def get_context_data(self, **kwargs):
    context = super().get_context_data(**kwargs)
    context['form'] = RegisterForm()
    return context

def post(self, request, *args, **kwargs):
    form = RegisterForm(request.POST, request.FILES)

    if form.is_valid():
        user = User.objects.create_user(
            username=form.cleaned_data['username'],
            email=form.cleaned_data['email'],
            password=form.cleaned_data['password'],
        )

        if form.cleaned_data.get('avatar'):
            user.avatar = form.cleaned_data['avatar']
            user.save()

        login(request, user)
        messages.success(request, "Вы успешно зарегистрированы!")
        return redirect("/")

@method_decorator(login_required, name='dispatch')
class QuestionLikeAPI(View):
    http_method_names = ["post"]

    def apply_vote(self, user, question, value):
        like = QuestionLike.objects.filter(user=user, question=question).first()
        old_value = like.value if like else 0
        new_value = value

        # если голос не меняется
        if old_value == new_value:
            return 0

        # снять голос
        if new_value == 0 and like:
            like.delete()
            return -old_value

        # поставить голос впервые
        if not like:
            QuestionLike.objects.create(user=user, question=question,
value=new_value)
            return new_value

        # сменить лайк на дизлайк
        like.value = new_value
        like.save(update_fields=['value'])
        return new_value - old_value

```

```

def post(self, request, *args, **kwargs):
    user = request.user
    question_id = kwargs.get('question_id')
    question = get_object_or_404(Question, id=question_id)

    if question.author == user:
        return JsonResponse({
            'success': False,
            'error': 'Вы являетесь автором вопроса.'
        }, status=400)

    if 'dislike' in request.path:
        value = -1
    elif 'like' in request.path:
        value = 1
    else:
        return JsonResponse({
            'success': False,
            'error': 'Некорректное действие.'
        }, status=400)

    delta = self.apply_vote(user=user, question=question, value=value)

    question.refresh_from_db()
    return JsonResponse({
        'success': True,
        'delta': delta,
        'score': question.score
    })

```

'''пока что коды классов QuestionLikeAPI и AnswerLikeAPI совпадают, но работают -
позже я избавлюсь от дублирования'''

```

@method_decorator(login_required, name='dispatch')
class AnswerLikeAPI(View):
    http_method_names = ["post"]

    def apply_vote(self, user, answer, value):
        like = AnswerLike.objects.filter(user=user, answer=answer).first()
        old_value = like.value if like else 0
        new_value = value

        if old_value == new_value:
            return 0

        if new_value == 0 and like:

```

```

        like.delete()
        return -old_value

    if not like:
        AnswerLike.objects.create(user=user, answer=answer, value=new_value)
        return new_value

    like.value = new_value
    like.save(update_fields=['value'])
    return new_value - old_value

def post(self, request, *args, **kwargs):
    user = request.user
    answer_id = kwargs.get('answer_id')
    answer = get_object_or_404(Answer, id=answer_id)

    if answer.author == user:
        return JsonResponse({
            'success': False,
            'error': 'Вы являетесь автором вопроса.'
        }, status=400)

    if 'dislike' in request.path:
        value = -1
    elif 'like' in request.path:
        value = 1
    else:
        return JsonResponse({
            'success': False,
            'error': 'Некорректное действие.'
        }, status=400)

    delta = self.apply_vote(user=user, answer=answer, value=value)

    answer.refresh_from_db()
    return JsonResponse({
        'success': True,
        'delta': delta,
        'score': answer.score
    })

@method_decorator(login_required, name='dispatch')
class MarkCorrectAnswerAPI(View):
    http_method_names = ["post"]

    def post(self, request, *args, **kwargs):
        answer_id = kwargs.get('answer_id')
        answer = get_object_or_404(Answer, id=answer_id)
        question = answer.question

```

```

        if question.author != request.user:
            return JsonResponse({
                'success': False,
                'error': 'Только автор вопроса может выбирать правильный ответ.'
            }, status=403)
        if answer.is_correct:
            answer.is_correct = False
        else:
            Answer.objects.filter(question=question,
is_correct=True).update(is_correct=False)
            answer.is_correct = True

        answer.save()

    return JsonResponse({
        'success': True,
        'is_correct': answer.is_correct
    })

```

forms.py

```

from django import forms
from django.contrib.auth import authenticate
from django.forms.widgets import PasswordInput
from django.forms.widgets import FileInput

from app.models import Question, User, Answer

class LoginForm(forms.Form):
    username = forms.CharField(
        max_length=150,
        widget=forms.TextInput(attrs={
            'class': 'form-control',
            'placeholder': 'Имя пользователя',
            'autocomplete': 'username'
        })
    )
    password = forms.CharField(
        max_length=128,
        widget=PasswordInput(attrs={
            'class': 'form-control',
            'placeholder': 'Пароль',
            'autocomplete': 'current-password'
        })
    )

    def clean(self):
        cleaned_data = super().clean()
        username = cleaned_data.get('username')

```

```

        password = cleaned_data.get('password')

        if username and password:
            self.user = authenticate(username=username, password=password)
            if self.user is None:
                raise forms.ValidationError(
                    'Неверное имя пользователя или пароль'
                )

        return cleaned_data

class QuestionForm(forms.ModelForm):
    image = forms.ImageField(widget=FileInput, required=False)

    class Meta:
        model = Question
        fields = ('title', 'text') # 'tags'

class RegisterForm(forms.Form):
    username = forms.CharField(
        max_length=150,
        widget=forms.TextInput(attrs={
            'class': 'form-control',
            'placeholder': 'Имя пользователя',
            'autocomplete': 'username'
        })
    )
    email = forms.EmailField(
        max_length=150,
        widget=forms.TextInput(attrs={
            'class': 'form-control',
            'placeholder': 'Email',
            'autocomplete': 'email'
        })
    )
    password = forms.CharField(
        max_length=128,
        widget=forms.PasswordInput(attrs={
            'class': 'form-control',
            'placeholder': 'Пароль',
            'autocomplete': 'new-password'
        })),
    )
    password_repeat = forms.CharField(
        max_length=128,
        widget=forms.PasswordInput(attrs={
            'class': 'form-control',
            'placeholder': 'Повторите пароль',
            'autocomplete': 'new-password'
        })),
    )

```

```

avatar = forms.ImageField(required=False)

def clean_username(self):
    username = self.cleaned_data['username']
    if User.objects.filter(username=username).exists():
        raise forms.ValidationError("Пользователь с таким именем уже существует")
    return username

def clean(self):
    cleaned_data = super().clean()
    password = cleaned_data.get('password')
    password_repeat = cleaned_data.get('password_repeat')

    if password and password_repeat and password != password_repeat:
        raise forms.ValidationError("Пароли не совпадают")

    return cleaned_data

class AnswerForm(forms.ModelForm):
    widgets = {
        'answer_text': forms.Textarea(attrs={
            'class': 'form-control',
            'placeholder': 'Введите ваш ответ здесь...',
            'rows': 5
        })
    }
    class Meta:
        model = Answer
        fields = ('answer_text',)

```

urls.py

```

from django.urls import path
from .views import QuestionListView, QuestionView, AuthView, CreateQuestionView,
RegisterView, ask, settings, logout_view, QuestionLikeAPI, AnswerLikeAPI,
MarkCorrectAnswerAPI

urlpatterns = [
    path('', QuestionListView.as_view(), name='index'),
    path('page/<int:page>/', QuestionListView.as_view(), name='index_page'),
    path('ask/', CreateQuestionView.as_view(), name='ask'),
    path('login/', AuthView.as_view(), name='login'),
    path('signup/', RegisterView.as_view(), name='signup'),
    path('settings/', settings, name='settings'),
    path('question/<int:question_id>/', QuestionView.as_view(), name='question'),
    path('logout/', logout_view, name="logout"),

```



```

    path('question/<int:question_id>/like', QuestionLikeAPI.as_view(),
name='question_like'),
    path('question/<int:question_id>/dislike', QuestionLikeAPI.as_view(),
name='question_dislike'),
    path('answer/<int:answer_id>/like', AnswerLikeAPI.as_view(),
name='answer_like'),
    path('answer/<int:answer_id>/dislike', AnswerLikeAPI.as_view(),
name='answer_dislike'),
    path('answer/<int:answer_id>/correct/', MarkCorrectAnswerAPI.as_view(),
name='mark_correct'),
]

```

Скриншот работы программы



Рис. 1. Главная страница

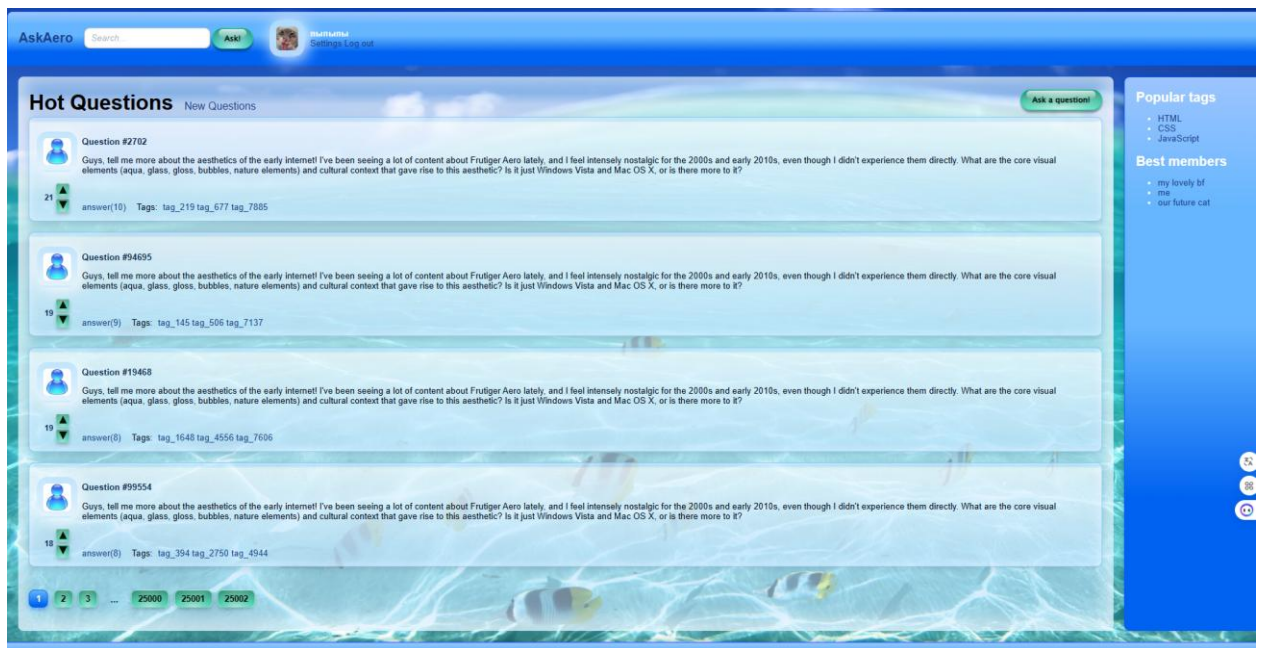


Рис. 2. Страница вопросов отсортированных по рейтингу



Рис. 3. Страница вопросов, содержащих исходный тег



Рис. 4. Страница входа



Рис. 5. Страница регистрации



Рис. 6. Страница настроек пользователя

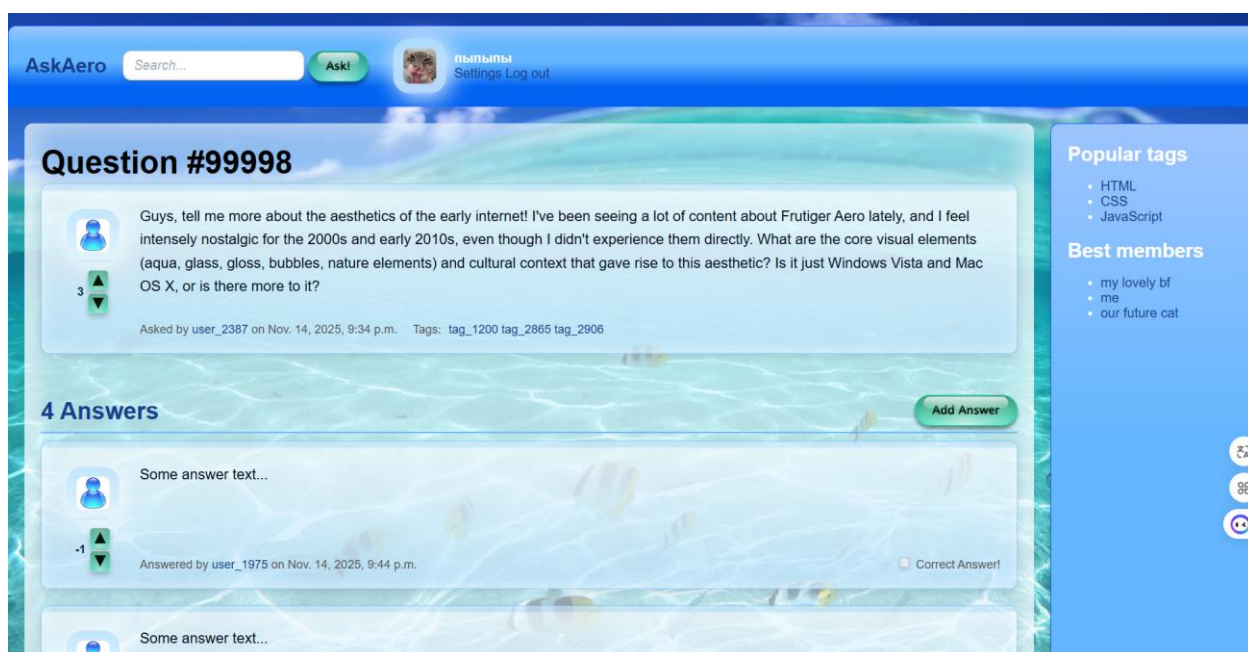


Рис. 7. Страница вопроса