Практическая работа №2. Кодировки

Задание 1. Кодирование US-ASCII

Задание 1а. Непечатаемые символы

С помощью Powershell (Windows) или Терминала (Linux, macOS) выведите символ с номерами 7, 9 и 10 (обозначаемые также как \a, \t, \n).

Для этого напишите команды в Powershell:

```
"`a `n`t"
"a = $( [int]"`a"[0] ) - символ: `a и дальше текст"
"n = $( [int]"`n"[0] ) - символ: `n и дальше текст"
"t = $( [int]"`t"[0] ) - символ `t и дальше текст"
```

Или в терминале Linux/macOS:

```
echo -e "\a\n\t"
printf '\\a = %d\n\\n = %d\n\\t = %d\n' "'\a" "'\n" "'\t"
```

Что получилось? Что делают символы с кодами 7, 9, и 10? А какой код у символа пробел?

Задание 1б. Печатаемые символы ASCII

Приведите несколько ($N \geq 3$) сравнительных пар текстов (текстовых файлов), которые похожи по смыслу, но одни будут открываться в любых текстовых редакторах, а другие будут требовать дополнительной настройки или не работать?

(Пример: старая книжка по программированию, выложенная в виде .txt, на английском и на русском языках)

Задание 1в. Старый почтовый сервер

Электронное письмо, с точки зрения внутреннего устройства, первоначально представляло собой текстовый файл с заголовком и телом, разделенными пустой строкой:

```
From: (not)MIREA <i_am_pedro_from_sao_paolo@mail.br>
To: <ivanov.i.i@edu.mirea.ru>
Subject: URGENT NEWS CLICK ME IMMEDIATELY
Content-Type:
Content-Transfer-Encoding:

Hello pls visit my amazing website example.org. Because I love your credit card.
```

> **Совет**
>
> Кстати говоря, в примере — вымышленное фишинговое письмо, такие лучше даже не открывать или открывать, предварительно обязательно поместив в папку Спам и отключив подгрузку картинок и прочих внешних ресурсов.
>
> И да, интересный факт: отображаемое имя и правда технически может и не соответствовать настоящему адресу, а вот сам обратный email-адрес, скорее всего, и правда существует, но проблема в том, что в общем случае он никак не идентифицирует владельца и может быть «фейковым».

Представьте, что в организации используется устаревший почтовый сервер, который исторически работал только с письмами в формате US-ASCII. Ранее он без проблем пересылал все письма дальше по цепочке SMTP-серверов.

Но в какой-то момент администратор подключил спам-фильтр никак не модернизировав сервер и софт. После этого пользователи заметили, что некоторые легальные письма (например, письма с кириллицей в тексте, письма с вложениями или форматированным текстом) перестали доходить до адресатов и «пропадают».

Вопрос: почему такие письма могут исчезать, даже если они не являются спамом?

Задание 2. Кодирование Windows-1251

Закодируйте свое ФИО на однобайтной кириллической кодировке Windows-1251 в формате

`Фамилия, Имя, Отчество.`

Иными словами: Фамилия,Запятая,Пробел,Имя,Запятая,Пробел,Отчество,Точка

Задание 3. Внутренняя структура Юникода

Скопируйте строчку и вставьте в текстовый редактор. (Подойдет VS Code. Предварительно установите расширение Hex Editor)

AA 🏄‍♂️‍💥😁

Переключитесь в режим шестнадцатеричного редактора. Для этого ПКМ по названию файла на вкладке VS Code, затем выберите «Reopen Editor With… HEX editor»

Понаблюдайте, сколько байтов занимает каждый символ, сопоставляя их между текстовым и двоичным представлением. Опишите наблюдения в отчете.

Задание 4. Как вставить в отчет по практике голосовое сообщение?

Существует формат base64, специально предназначенный для отображения произвольных бинарных данных в виде ASCII-последовательности.

Например, в блоке текста ниже сохранена аудиозапись формата .OGG. Голос на записи произносит слово «Информатика».

Вопросы задания 4

1. (вне отчета) воспользуйтесь base64-конвертерами, скопируйте текст из примера ниже и убедитесь в том что как это работает.

2. создайте файл любого типа (за исключением исполняемых и узкоспециальных; при использовании нетипичных форматов рекомендуется уточнить у преподавателя допустимость его использования и обговорите условия сдачи — помните, что преподаватель не обязан для проверки работ запускать код из неизвестных источников, устанавливать дополнительные программы, включая игры, и так далее) и запишите туда свое имя согласно **структуре** данного формата файла: в звуковом файле должны быть последовательности интерпретируемые как звук, в растровом изображении байты пикселей картинки, архив содержащий файл с Вашим именем, и так далее.

3. рекомендация: при исполнении п.2 по возможности избегайте избыточных размеров.

4. сохраните закодированную последовательность в отчет, сопроводив указанием изначально использовавшегося формата файла.

5. убедитесь в успешности, удалив свой исходный файл и декодировав его из текста отчета.

Неустранимо большие

Пример base64 (.ogg с записью слова «Информатика»)

T2dnUwACAAAAAAAAD0Mw1OAAAAAPOwlcoBE09wdXNIZWFkAQE4AYC7AAAAABPZ2dTAAAAAAAA
AAAAAPQzDU4BAAAAosTHAwP///5PcHVzVGFncxUAAABsaWJvcHVzIHVua25vd24tZml4ZWQAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
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AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
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AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAE9nZ1MAAMADAAAAAAAA
9DMNTgIAAACojJmRAQP4//5PZ2dTAACABwAAAAAAPQzDU4DAAAA29cmnQED+P/+T2dnUwAAQAsA
AAAAAAD0Mw1OBAAAAINENScBA/j//k9nZ1MAAAAPAAAAAAAA9DMNTgUAAADwH4orAQP4//5PZ2dT
AADAEgAAAAAAAPQzDU4GAAAADXe5aQL/gPh/aGeIPxChRlsL1CGG7ucy0jmAuMsstrvpOgl9/0mX
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